

In This Issue—Engineering for the Service Man—No. 7

MOTOR AGE

Vol. XLIV
Number 19

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CHICAGO, NOVEMBER 8, 1923

Thirty-five Cents a Copy
Three Dollars a Year

An appropriate
Gift
for any motorist

Dependable
CHAMPION
SPARK PLUGS
IN A SERVICE KIT

This handsome Christmas card is a part of the material furnished by Champion to aid every dealer in making his holiday trade profitable.

Champion Spark Plug Co.
Toledo, Ohio
Champion Spark Plug Company of Canada, Ltd.
Windsor, Ontario



Wrecking Cranes!



Get a
Manley

Ask your jobber to explain the advantages of the new Manley Swivel Nose Wrecking Crane.

If you want all the additional business a wrecking crane can get you, write for our booklet: "How to 'Cash in' on a Manley Wrecking Crane."

Your own jobber can supply
Manley Equipment without
delay.

Manley
Mfg. Co.
York, Pa.



HERE will be two million more cars on the road next year. There are more accidents in a large city than in a small town because there are *more people and more congestion*.

More cars on the road and more congestion is sure to mean more wrecks.

Without a wrecking crane you cannot expect to get any of these profitable rebuilding jobs.

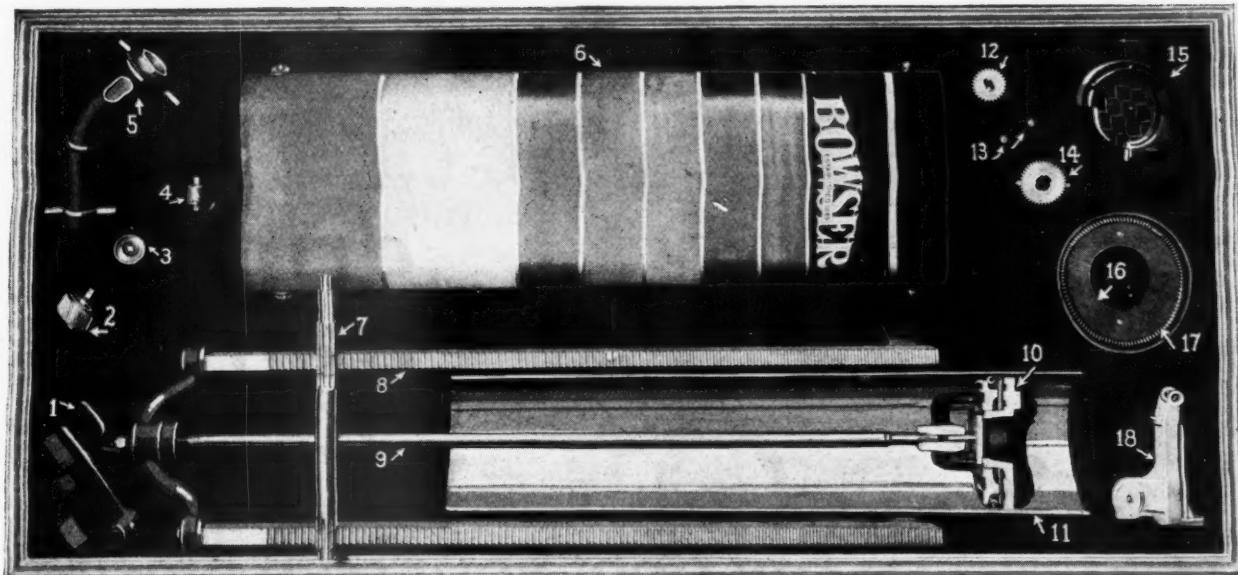
With a poorly designed and constructed crane you will eventually get into trouble.

A **GOOD CRANE** must pull out the wreck and hoist it quickly and easily.

A **GOOD CRANE** avoids danger of further damage to car and people in handling.

A **GOOD CRANE**, properly mounted, standing at your curb is one of your best advertisements.

That's why
we say:—



This is a picture of the famous Bowser parts board which made such a hit at the two conventions of oil men in October.

It illustrates the reasons for Bowser performance—points out the basis for the Bowser slogan "quality reduces maintenance."

The picture shows the working parts of the "Square Sentry," but nothing but careful examination of the pump and its parts can show the

quality of material and workmanship.

It will pay you to see them and compare our pumps, part by part and piece by piece, with every other pump on the market. We invite rigid inspection and careful comparison—for we realize that Bowser materials and Bowser workmanship are never excelled.

Ask today for folder A14 and our special "parts board" booklet, "The Sign of Quality."

S.F. BOWSER & COMPANY, Inc.
Pump and Tank Headquarters
 FORT WAYNE, INDIANA.
Sales and Service Offices and Representatives Everywhere



But don't your own profits leak just as surely?

THE hour of time not accounted for, the part that is not charged, the contract job on which you lose money—all are profits which drip away.

You can stop these losses and know each day just where you stand. You can know your profits each month. You can have a complete profit-and-loss statement always at your finger tips. You can stop leaks, prevent errors and earn greater profits by installing the Burroughs Simplified Accounting Plan for Garages.

So complete are the figures that an Income Tax Report can be made in less than an hour. Yet the plan is so simple that anyone in your employ can operate it.

Let the local Burroughs office show you how this plan applies to your business. Look under "Burroughs" in your telephone book, ask your banker, or fill out the coupon below.

Better Figures make Bigger Profits

Burroughs

ADDING • BOOKKEEPING • BILLING • CALCULATING MACHINES

Every
Burroughs Machine

+ ADDS
- SUBTRACTS
× MULTIPLIES
÷ DIVIDES

BURROUGHS SIMPLIFIED GARAGE ACCOUNTING PLAN	
DAILY DISTRIBUTION SHEET	
DATE	October 25, 1923
IMPORTANT DAILY FIGURE FACTS	
MONEY IN BANK	(FROM ACCT NO 2)
DUE FROM CUSTOMERS	(FROM ACCT NO 3)
DUE ME ON NOTES RECEIVABLE	(FROM ACCT NO 5)
MONEY OWED	
OWED FOR PURCHASES	(FROM ACCT NO 10)
OWED ON NOTES GIVEN	(FROM ACCT NO 11)
FIGURES WHICH INDICATE TENDENCY	
CASH RECEIVED ON ACCOUNT TODAY	COMPARE WITH AVERAGE
TOTAL SALES TODAY	(FROM ACCT NO 1)
COST OF SALES TODAY	(FROM ACCT NO 12)
TOTAL SALES TO DATE	(FROM ACCT NO 13)
CONTINGENT LIABILITY ON EN	WATCH CAR
GRATIS SERVICE EXPENSE IF	WATCH PERCENT
TOTAL EXPENSE	

Burroughs
Adding
Machine Co.
6020 Second Blvd.
Detroit, Mich.

Gentlemen: I would like to know more about the Burroughs Simplified Accounting Plan for Garages.

Name.....

Address.....

MOTOR AGE

Reg. U. S. Pat. Off.
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THE CLASS JOURNAL COMPANY

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CONTENTS

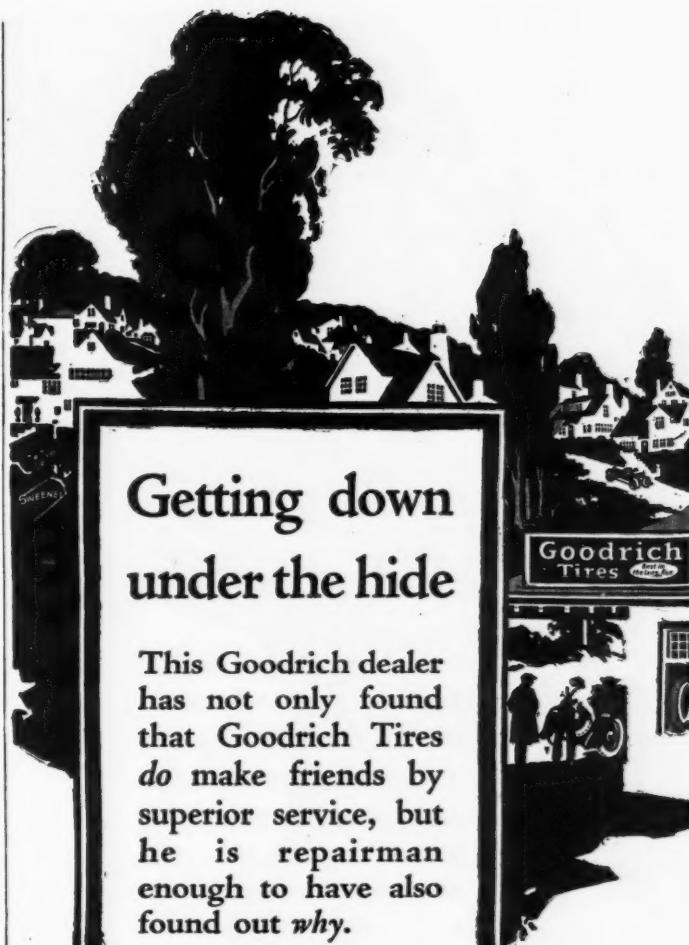
A. E. A. Show and Convention Next Week.....	9
By Clyde Jennings	
Brakes, Overhead Valve Engines, Balloon Tires and Refinements Features of French Show.....	11
Announcements from the Passenger Car Manufacturers.....	13
Engineering for the Service Man—No. 6.....	15
What the Maintenance Man Should Know About Four Wheel Brakes.....	17
By B. M. Ikert	
Neatness and Cleanliness Play a Part in the Sale of Accessories.....	23
Hard to Get Automotive Business in Winter? Think of the Ice Cream Man.....	25
MOTOR AGE'S Picture Pages of Automotive Interest.....	26
Editorials—	
Harking Back.....	28
Tires.....	28
Of Factory Interest.....	29
Drifting Backward.....	29
News of the Industry—	
Bankers Pay Tribute to Dealers.....	30
Hearing Postponed in Suit Against Haynes for Receiver.....	31
Ford Dealer Gives Business to Employees for Four Months.....	31
Detroit Dealers Sell 4,692 Cars; 581 Trucks in October.....	32
Closed Car is Mainstay of Industry, Says Reeves.....	33
Tire Manufacturers Agree That Customers Price List is Out.....	34
Garage Census Shows Need of Millions of Accessories.....	35
Packard Sells 21,571 for Year Ending August 31.....	36
October Sales in Chicago Better Than in September.....	37
Studebaker Builds More Cars, Makes More Money Than in 1922.....	37
Atlanta Dealers Contemplate General School of Instruction.....	38
Concerning Men You Know.....	39
Business Notes.....	40
In the Retail Field.....	41
The Readers' Clearing House—	
Resistance Wanted to Control Motor Speed.....	42
In Which the Architect Saves the Chestnuts.....	43
Lubrication of Hudson Clutch.....	44
The Supercharger for High Speed Engines.....	46
Flat Rates for the Electric Shop.....	46
Too Many Pigtails May Ground the Third Brush.....	47
Boosting Accessory Sales.....	48
Getting More out of the Shop.....	49
Coming Motor Events.....	50
Squeaks & Rattles.....	50
Specifications of Trucks, Tractors and Passenger Cars.....	51

Index to Advertisers Next to Last Page

SUBSCRIPTION RATES

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at Chicago, Ill., under Act of March 6, 1879.



Getting down under the hide

This Goodrich dealer has not only found that Goodrich Tires *do* make friends by superior service, but he is repairman enough to have also found out *why*.

"We have found from experience in repairing all makes that Goodrich is really 'Best in the Long Run.' We are now handling a complete line of Goodrich and our business has increased over 100% over last year."

PARSONS BROS.
TIRE COMPANY
Charleston, W. Va.

100% Goodrich!—and we happen to know that he tried out a good many other makes before he came to that conclusion.

The B. F. GOODRICH RUBBER CO.
Akron, Ohio

Goodrich

TIRES

"Best in the Long Run"



Advertised to 6,500,000!

Milwaukee Timer advantages—shown in clear pictures like the one of the fiber race above—are explained and "sold" to 6,500,000 people, in advertising that runs the year 'round. Here is a tremendous force at work to help the dealer sell Milwaukee Timers **in volume**—at \$2.00 each.

How This Feature Keeps Sales Growing

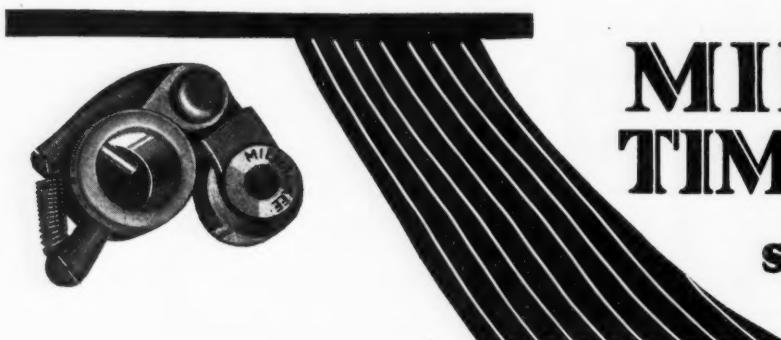
CONTACT surface that stays satin-smooth through months of mileage—no pits or bumps to cause misfiring and hard starting. That's a *Milwaukee Timer* characteristic—the feature that keeps Milwaukee users satisfied, and keeps them "selling" Milwaukee Timers to their friends.

Quicker starts, extra power, longer trouble-free life—you sell those three big assets with every Milwaukee Timer you pass over the counter. You know—and your customer knows—that it is the best two-dollars' worth a Ford owner can buy for his car.

Sure, there are cheaper timers. But you and your customers run a risk on them, while the Milwaukee is a certain value. Build your timer business on a sure foundation—and *make more money*.

If your timer stock is low, order Milwaukee from your jobber now. Packed 10 in a 4-color, "silent-salesman" Display Box.

MILWAUKEE MOTOR PRODUCTS, Inc.
MILWAUKEE, WISCONSIN
(Timer Builders for Over 18 Years)



MILWAUKEE TIMER for FORDS

Sells fast at \$2.00

[\$2.75 in Canada]

Three Chances to Sell Every Prospect

The first requirement for a successful business is a *variety of the right goods*.

If you have sold a line of cars comprising one touring model, one sedan model, etc., you know what it means to lose sales to your competitors for lack of a model a little bigger or a little smaller, less expensive or more expensive.

The Studebaker dealer offers three distinct models—in 13 body types—a splendid variety. If the prospect wavers over a Light-Six Sedan, he can be sold a Special-Six Sedan. Or if his buying power is greater and he has a sizeable family, the Big-Six Sedan will satisfy him.

Whichever he buys, it's a Studebaker, and *the Studebaker dealer is the dealer in all three lines*. He has three chances to make the sale.

And some day he'll sell him again. Whether the prospect is more prosperous or less prosperous than when he bought his first Studebaker, the Studebaker dealer will again have a car that will exactly suit the prospect's needs—and his wishes.

Unless you have a car, in your line that appeals to every section of the quality market, you can't expect to get your proper proportion of all the business.

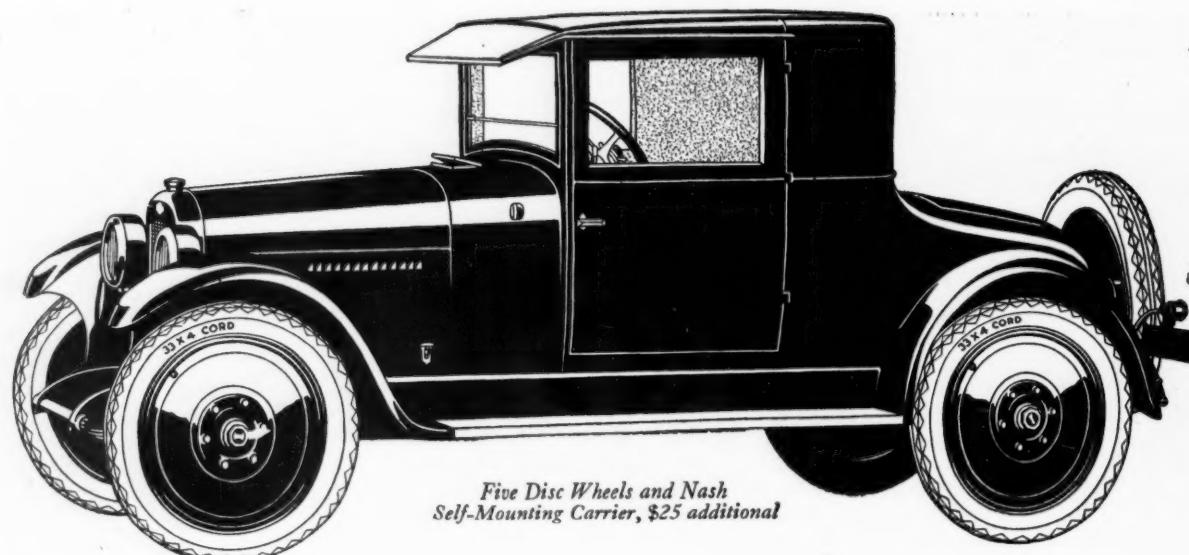
1924 MODELS AND PRICES— <i>f. o. b. factory</i>		
LIGHT-SIX	SPECIAL-SIX	BIG-SIX
5-Pass., 112" W. B., 40 H. P.	5-Pass., 119" W. B., 50 H. P.	7-Pass., 126" W. B., 60 H. P.
Touring..... \$995	Touring..... \$1350	Touring..... \$1750
Roadster (3-Pass.)..... 975	Roadster (2-Pass.)..... 1325	Speedster (5-Pass.)..... 1835
Coupe-Roadster (2-Pass.) 1225	Coupe (5-Pass.)..... 1975	Coupe (5-Pass.)..... 2550
Coupe (5-Pass.)..... 1475	Sedan..... 2050	Sedan..... 2750
Sedan..... 1550		

THE STUDEBAKER CORPORATION OF AMERICA
South Bend, Indiana

STUDEBAKER



THIS IS A STUDEBAKER YEAR



Announcing the

New Nash Business Coupe

Four Cylinders

With thought of widening the market for Nash dealers and extending their range of profit Nash has produced a four-cylinder Business Coupe.

It is well calculated to appeal strongly to the Purchasing Agent selecting equipment for his travelers as well as to the individual seeking a practical car for business employment.

First and foremost among its advantages is the economy of its service.

Careful tabulations of gas and oil used checked against trip mileage and calls made will show it to be a very thrifty method of covering territory.

And Nash has built it ruggedly with every provision against the road-punishment of daily duty and constant use.

Big luggage and package space has been embodied by incorporating two large compartments—one back of the driver's seat and the other beneath the rear deck.

The upholstery is of fine leather, and the most durable wool-cloth is used for the interior trim.

Doors are very wide and broad windows give extra clear vision.

It is the Nash development of readily salable models such as this Business Coupe that is quickening the turnover for Nash dealers and increasing their sales volume.

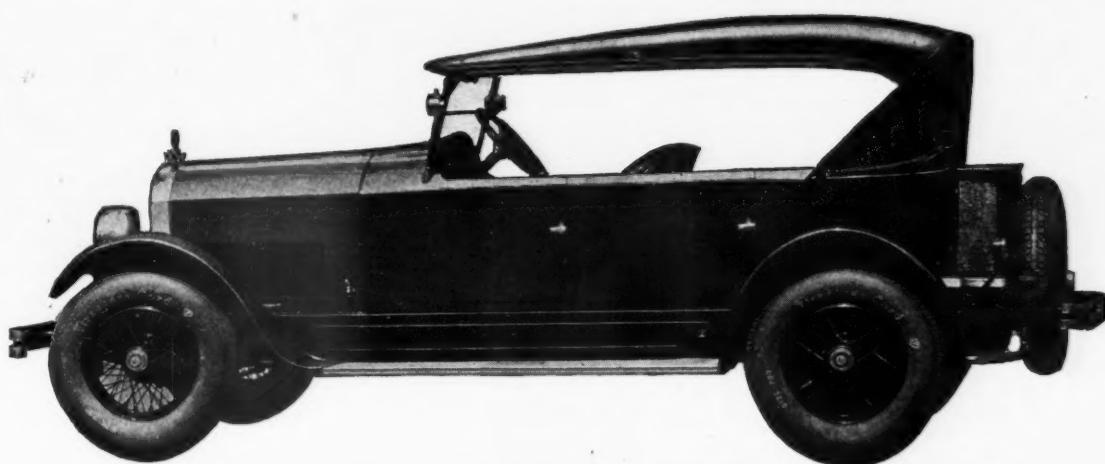
In keeping with a progressive sales program Nash is now ready to award some valuable new territory. Wire today for information.

NASH

The Nash Motors Company, Kenosha, Wisconsin

(2269)

There's a Touch of Tomorrow in All Cole Does Today



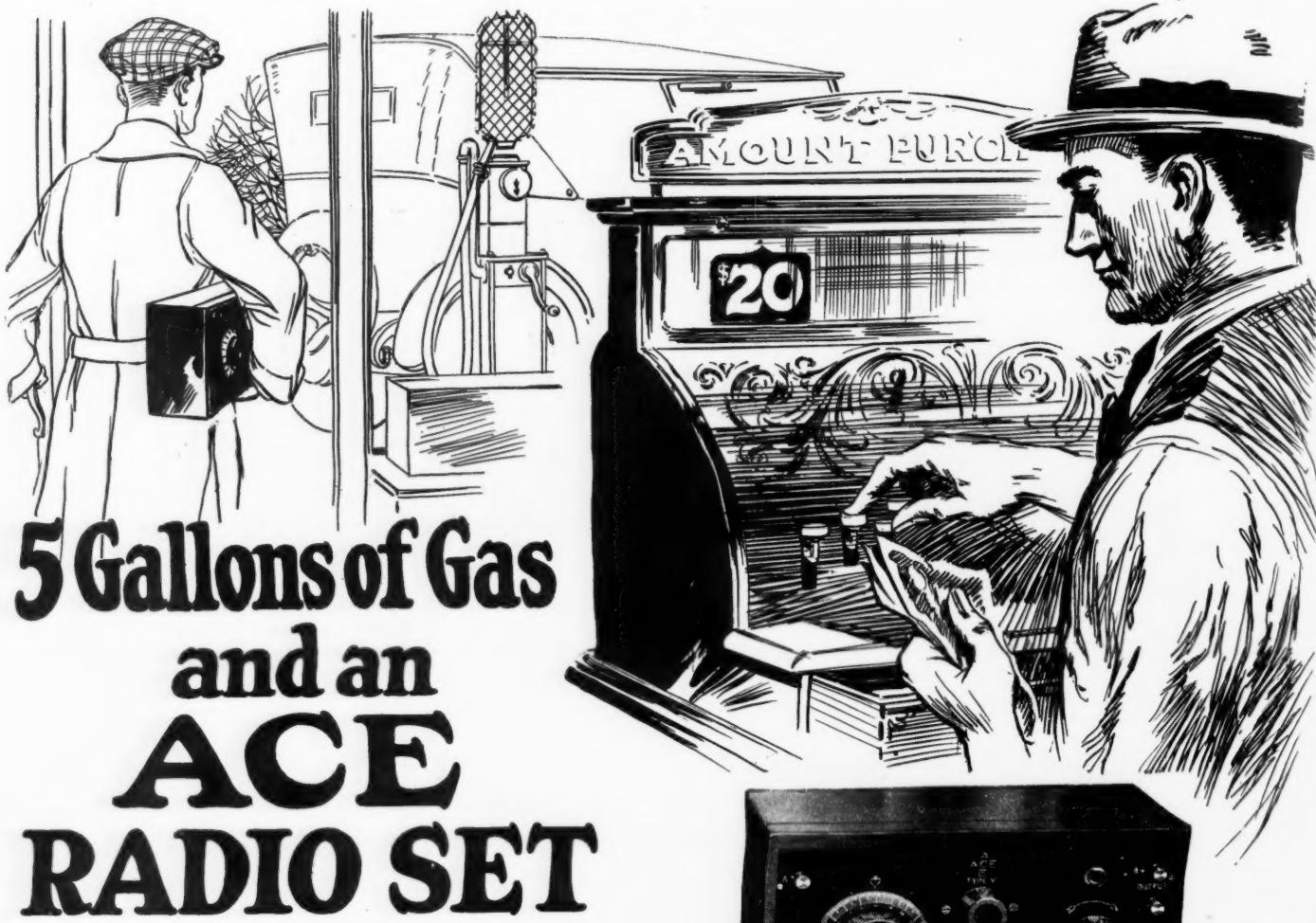
25 POUNDS
LOW AIR PRESSURE

The less you have to service the new improvements people are demanding today in motor cars the more money you are going to make per sale.

Balloon Tires are making profitable sales for Cole Dealers without any service complications.

COLE

COLE MOTOR CAR COMPANY :: INDIANAPOLIS, U. S. A.



5 Gallons of Gas and an **ACE** **RADIO SET**

You fellows who sell auto supplies are passing up one of the biggest opportunities of your business career every day you neglect putting in a good radio line—and the Ace Family of Radio Sets is sure the one "to tune in on." You can "pick up" sales all over your territory with them.

The Ace Type V which is shown at the right sells for \$20.00 on which you as a dealer make a big profit. The Ace Type V is an Armstrong Regenerative receiver, licensed under the Armstrong U. S. Patent No. 1,113,149. Stations are heard distinctly on it from coast to coast. Fill in the coupon now—get full information—let us explain in detail how you can increase sales with the same overhead you now have—do it now.

The Precision Equipment Company

Powell Crosley, Jr., PRES.

1153 VANDALIA AVENUE, CINCINNATI, OHIO

NEW PROFITS COUPON

The Precision Equipment Co.,
Powell Crosley, Jr., Pres.,
1153 Vandalia Ave., Cincinnati, Ohio.

Gentlemen:

Send complete facts about your special sales plan for Accessory Dealers and Garage Owners.

Name _____

Street _____

City _____ State _____

Ace Type 3C Consolette

This is a new addition to the Ace Family. Has beautiful solid mahogany cabinet. Set consists of a regenerative tuner, detector and two stages of amplification, with built in loud speaker. The tuning circuit is licensed under the Armstrong U. S. Patent No. 1,113,149 and due to the particular method of winding Crosley coils it is exceptionally selective. Has sufficient room inside Cabinet for dry batteries making a complete self contained long range receiving outfit. Phone jack for tuning with head phones; Crosley multistat; filament switch; Crosley moulded condenser; beautifully engraved formica panel; Uses all kinds of tubes. A wonderful set that sells for \$125.00—without tubes or batteries.

The New Ace Type 3B

This set is equal to a combination of the Ace Type V and the Ace two-stage amplifier. Manufactured under Armstrong U. S. Patent No. 1,113,149. A filament switch eliminates necessity of turning out rheostats when set is not in use. You may turn off the set by throwing switch and come back later without retuning. Has telephone jack. Crosley multistat. Universal filament control rheostats for all makes of tubes. Sells for \$50.00.

MOTOR AGE

A. E. A. Board of Directors: Lower row, left to right—G. Norman Baughman, G. Norman Baughman Co., Tampa, Fla.; W. L. Moneur, Cutten & Foster, Ltd., Toronto; William M. Webster, Commissioner of Association; Miss Kathryn Marron, secretary; N. H. Oliver, Metal Specialties Mfg. Co., Chicago, president of the A. E. A.; F. B. Caswell, Champion Spark Plug Co., Toledo; G. H. Southard, Berkshire Products Corp., Pittsfield, Pa.; N. F. Ozburn, Ozburn-Abston & Co., Memphis, Tenn.



Second row—W. T. Morris, American Chain Co., Bridgeport, Conn.; Wallace G. Page, American Motor Equipment Co., Boston; W. E. Wissler, Herring Motor Co., Des Moines; W. C. Hecker, Curtis Pneumatic Machinery Co., St. Louis; S. D. Black, Black & Decker Mfg. Co., Baltimore; Percival Stern, Interstate Electric Co., New Orleans. Third row—C. C. Hillis, Electric Appliance Co., San Francisco; W. H. Parken, National Standard Co., Niles, Mich.; C. L. Hodgson, Weaver Mfg. Co., Springfield, Ill.; E. V. Hennecke, Motor-Meter Co., Long Island City, N. Y., chairman of the board. This picture was taken at the Dixville Notch Convention last summer. "Close-ups" of President N. H. Oliver and Commissioner William M. Webster are shown at the lower left and upper right.

A. E. A. Show and Convention Next Week

Appreciation of Shop Equipment Market Is Strong Feature in Boosting Demand for Exhibition Space. New Merchandising Program Is Due

By CLYDE JENNINGS

THE Automotive Equipment Association will hold its annual meeting and show in Chicago, at the Coliseum, next week. The show will be the largest show ever held under the auspices of this association. This year when the Greer Building was leased in addition to the Coliseum, Commissioner Webster thought he had solved the problem of space.

He soon found out differently, however. Among other things the Commissioner expected to do was to have a number of conference rooms on the exhibition floor. But these soon went by the board, and weeks ago the space was all taken and the squeezing of exhibits in odd corners began. At the last moment the balcony was opened to exhibits.

According to the information that reaches MOTOR AGE unofficially, much of this demand for space is due to a realization by many manufacturers of the possibilities of the shop equipment field. In previous years a good many manufacturers apparently did not regard this field as very much worth while, but within the last year there has been a considerable change of estimate of values.

MOTOR AGE expects to see, after this show, a considerable change in the attitude of many jobbers toward the sale of shop equipment. Reports are reaching us from many sections of the country of jobbers who are opening shop equipment sales-rooms.

A shop equipment salesroom is a room where the equipment handled by the jobber is on exhibition, under power, and where a dealer can come and see the machine that he wants to buy actually doing the work. Some of the jobbers carry this to the point of asking the maintenance dealer to bring in a job and complete it in their shop.

In the case of a prospect for the sale of a burning in machine, such a visit would result in this sort of a demonstration. The dealer brings in the block and in addition to a demonstration of the burning in machine, the jobber has an opportunity to demonstrate the following:

- Main bearing babbitting jig.
- Cylinder refinishing tools.
- Engine stand.
- Arbor and straightening press.
- Aligning jigs.
- Power valve grinders.

A considerable sales opportunity, we would say. Very much better than carrying a circular around in a brief case and having a busy salesman who does not know much about actual operations explain it.

A New Vision

This year has seen a considerable advance in the appreciation of the equipment market and of those things that must go with the sale. A realization of the fact that so many dealers were not making money on their equipment and required instructions as to charging for the work done on the machinery as well as instructions on how to run the machine, has marked a considerable step in advance of the old methods.

The advance of the flat rate idea in thousands of shops has brought home to the maintenance dealer and the maintenance departments of larger establishment just what time means in these shops, but more than that, it has brought home the cost of overhead.

The display of machinery, as most jobbers now know through their investigations, means little or nothing unless they convince the dealer who buys this machinery that he can make money on it.

Along with the increased display of maintenance machinery comes an increased appreciation of the "aftermarket" of the car and manufacturers of the accessory lines are realizing to what extent an educational movement is necessary to the best promotion of their lines.

A realization of the work accomplished by the Merchandising Committee of the A. E. A. is taking hold and is bringing home to them just what education can and will do for them. Many of those who were less than lukewarm to the merchandising movement are now realizing to what extent this has increased their sales.

This combination of things is what is creating the increased demand for show space. It is what is making the annual gathering of the A. E. A. of major importance to even those who cannot attend this meeting.

Unique Organization

The Automotive Equipment Association is unique among the business organizations in the automotive industry. It is the only association that includes in its membership both maker and buyer of merchandise.

The A. E. A. membership of something more than 500 is almost balanced between jobbers and manufacturers and over a course of years the applications have kept this balance about even. There are differences of opinions always between the groups but these are ironed out in conferences, in committees, or in the joint sessions.

The association originally had as its chief aim the promotion of Fair Trade Practice which code was drawn early in the

history of the A. E. A. and which continues to be a chief point on the program. This code is always featured in **The Leader**, the house organ of the association.

Later came the annual show, which of recent years has been held in Chicago. For several years this show was open to those who came to see it but last year it was a "closed" show, only members being admitted. This was an experiment and apparently was not entirely satisfactory, as this year nearly 200 jobbers have been invited to attend the show.

The A. E. A. show is noted chiefly for its heavy buying as the manufacturers are there for business rather than to impress the public. Only members are permitted to exhibit. There is an impression abroad that this association pledges the jobber members to buy of the manufacturer members and the manufacturer members to sell to the jobbers, or at least give the members an advantage or first choice of the lines.

Influence Not Dictation

This is not true in actual practice. Doubtless the association in the organization does have such an influence, which would be only natural. But the A. E. A. as an organization does not attempt such dictatorial methods with their members.

Another thing that is peculiar to the A. E. A. is that members are paid for attending meetings. Not only do the annual dues cover the expenses of the association but the firm member who is designated as the delegate to the convention has his expenses paid and is paid a fee for each session of business meetings or show that he attended.

The sessions of the association are also different from most conventions. There is little of the usual sort of program. Few speakers from the outside are invited and members only speak when they have something to say. They are not assigned subjects and given time to talk regardless. The basis of the program is the Commissioner's report which covers the happenings within the A. E. A. activities during the six months, reports from the Board of Directors and complaints.

Serious Committee Work

The committees of the A. E. A. work quite seriously. Their inquiry into the practices and standings of the applicants for membership are sharp indeed. Also the Fair Practice committee goes deeply into complaints.

There are also committees which suggest remedies for useless expense and it was such a committee that decided on sizes of catalogue pages and got out the A. E. A. catalogue, which is a catalogue of the products of all the manufacturing members. This committee has brought about a plan whereby jobbers can standardize their catalogue pages and get pages or fractions from the manufacturer and thus avoid another setting of the type.

The Merchandising Committee, which was created two years ago last June, has developed into an interesting feature of the A. E. A. work. Many members of the association did not think that such an effort could really increase sales. After two years' work on the part of the committee, even the most conservative follower of the supply and demand rule has been converted to the idea that demand can be stimulated.

The "Ask 'em to Buy" and "Shop Profits" films were products of this committee and certainly no one is in position today to deny that these films have increased trade. The "Automotive Christmas" movement also developed from this committee's work and today hundreds of manufacturers, many not in the A. E. A., are shouting praises of this movement.

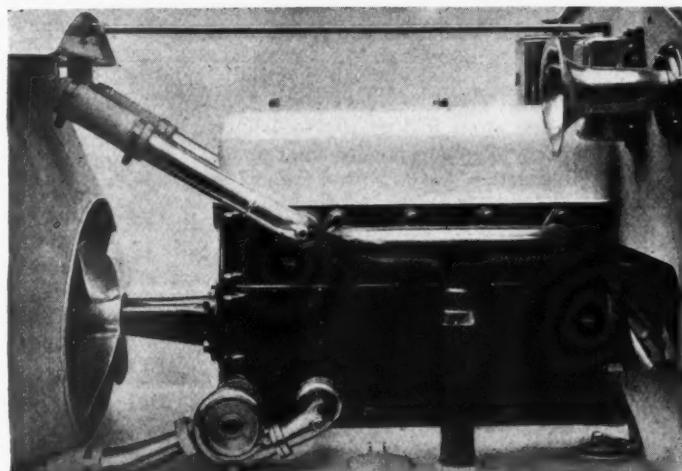
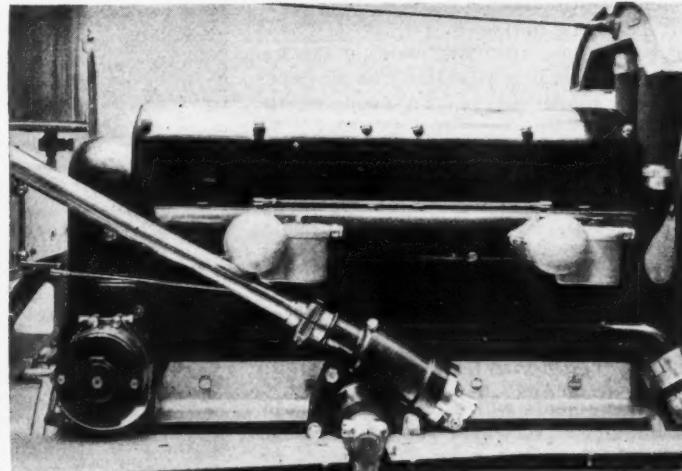
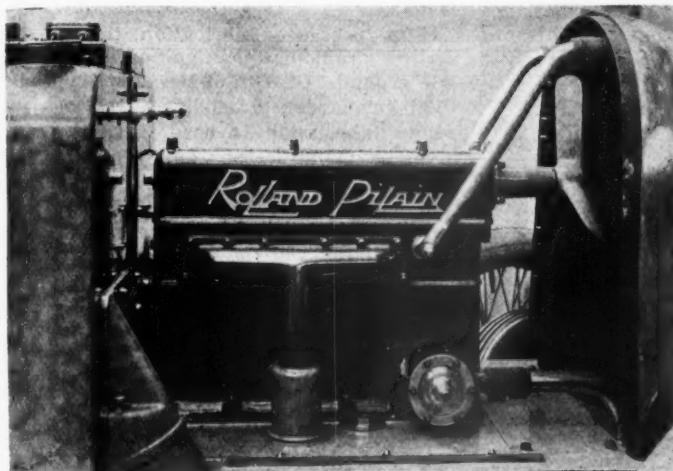
This committee must go before the convention in Chicago next week for a new program. Last June the Christmas film, now being shown to hundreds of trade audiences in the country and which is the basis of the "Automotive Christmas" urge, was shown to the convention and accepted as the program for the rest of the year. Now comes the necessity for a program for carrying on this work.

The merchandising movement has been financed through assessments paid by members of the A. E. A. So far it has cost more than \$100,000 according to reports, and most members think the money well invested.

This year an independent show is a feature. R. M. Jones, a Chicago man, is putting on a show at the Armory at which a number of non-A. E. A. members will exhibit their wares. Formerly these non-member exhibitors were held to hotel exhibits. The independent show is open to all who may come.

Brakes, Overhead Valve Engines, Balloon Tires and Refinements Features of French Show

Home Demand for Vehicles Good; Export Demand Growing. Transmission on Voisin One of Outstanding Technical Features. Racing Engine Design Influence Seen in Several Lubrication Systems



Three examples of clean cut engine layouts at Paris show. Upper left, Rolland-Pilain, with fan, driven off camshaft, and battery boxes in aluminum dash. Upper right, Chenard-Walcker with vertical shaft at rear and generator and magneto crosswise. It is an eight cylinder. The other engine is the Vermorel in which the fan is driven by "toothless" pinions off the vertical shaft

A VERY good feeling as to trade prospects was much in evidence at the annual French Automobile Show at the Grand Palais, Oct. 4 to 14. The home demand for vehicles is very good and the export demand is growing. Production is considered good this year, with prospects for a better production during 1924. It is believed here that the next year will see a considerable movement in the survival of the fittest.

Citroen is installing many American machine tools to equip his plant for greater production. Delage, Unic and Hotchkiss are making preparations for a greater production in 1924.

French dealers reported that for the first time French farmers are buying cars, and while there is an unusual demand for all classes of cars in the country, that the demand for the popular priced models is the strongest. Much of the export business is based on the present satisfactory exchange rate.

Piston Displacement Decreasing

This year's show clearly indicates that the average piston displacement is on the down grade and, in the opinion of leading Continental engineers, this tendency will continue. Even when not making this type of car, engineers predict that we are coming to the 122 cu. in. engine for the great majority of cars, bigger piston displacements being reserved for very costly models.

The position of the four-cylinder engine has been strengthened. The eight-cylinder V-type has died out, all the makers producing it after the war having now abandoned it. On the other hand, there is a slight tendency towards the small straight eight, one of these being shown this year by the Chenard-Walcker company. More pronounced is the move towards the small six having a piston displacement not exceeding 183 cu. in.

Big Amount of Detailed Improvement

There are less than one dozen entirely new chassis in the show, but there is an immense amount of detailed improvement, with more variety than can be

found among the automobile products of any other nation in the world.

Speaking broadly, there are four main divisions, as follows: The cheap 10 h.p. model four-seater, the leading producers of which are Citroen and Renault; the medium class 12 to 15 h.p. model with an engine of about 122 cu. in.; the high class 20 to 30 h.p. model with open body, and the luxury type nearly always sold with custom bodies.

One of the outstanding technical features of the show is the Sainsaud de Lavaud transmission for which the Voisin company holds the world's rights for application to automobiles. It is admitted by the Voisin engineers that this transmission is not quite ready for putting into the hands of the public, but it is claimed that the difficulties are minor ones which can be overcome in six months.

Four Main Technical Features at Show

The change is revolutionary, for it entails the abolition of the gearbox and present types of final drive and gives a car which automatically selects the final gear ratio according to the resistance encountered by the road wheels. In addition to its automobile use, there are immense possibilities for this transmission on rail vehicles, for it gets over the difficulty inherent to the internal explosion engine of starting away with very heavy loads.

There are four main technical features in the show: Brakes, overhead valve engines, refinements, and balloon tires. The brake situation has been consolidated, for at the present time Citroen is the only maker in France who does not fit front wheel brakes to any of his models. The reasons for this are the difficulty of applying front wheel brakes to the type of front spring adopted by Citroen, the fact that the cars are built to a low price, and the big production methods which make any radical change difficult and slow.

It is worth noting that there is not a single firm on the continent of Europe endeavoring to justify the non-adoption of front wheel brakes on some of its models by arguments such as have been brought forth in America. Instead of trying to find technical objections to this system of braking, the few not using it confine themselves to the statement that their existing brakes are sufficient for the size and weight of their car, or they try to offset their disadvantage by a price advantage.

Brake Arguments Cause Amusement

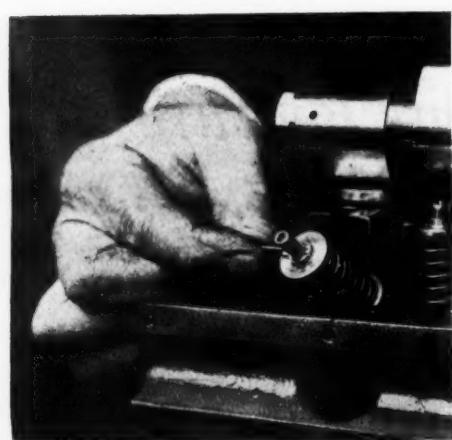
The arguments which have been served up by some American makers against front wheel brakes have only served to cause amusement in France. It is worth noting that a few of the strongest supporters of front wheel brakes are beginning to voice the danger of over-efficiency in retardation. Four-wheel brakes are so powerful on some of the high-grade cars that tires and spring attachments suffer.

While there is uniformity in general lines, details of brake application reveal plenty of variety. There are no external band brakes in the show, with the exception of the Buick; Perrot type dominates; servo mechanisms have increased a little and there is a certain tendency to abolish brakes on the rear wheel drums and to link up the transmission and the front wheel brakes, leaving the rear wheel brakes to be applied separately by hand.

Fiat and Delage are making use of a hydraulic servo-mechanism, having a great deal in common, both being mounted on high-grade six-cylinder models. Renault has adopted a band type of servo-mechanism enclosed on the lefthand side of the gearbox. Chenard-Walcker and Bignan are using the Hallot servo-mechanism and automatic regulator, the brakes being on the transmission and on the front, with no drums on the rear wheels.

Two Brake Pedals on This Car

Cottin-Desgouttes is original in having two brake pedals, one operating on front and rear simultaneously and the other on the transmission; the hand lever gives separate control to front and rear sets simultaneously. The Sizaire Brothers are using an internal band type brake with cable control throughout, the anchored end of the single cable being the only point of adjustment. For the vast majority brakes are applied simultaneously front and rear on equal size drums with equal leverage for both.



The valve springs can be removed without the use of tools on the new Sizaire engine

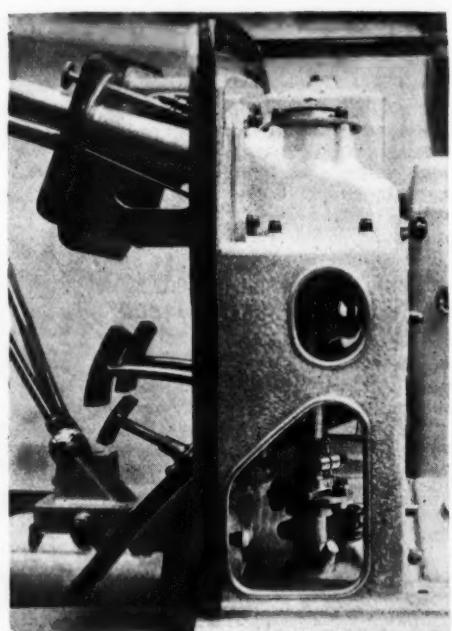
Enormous progress has been made in the number of overhead valve engines, for all the new models produced have this type of valve, while many of last year's models have been modified to overhead valves on the old-type engine base. It is difficult to find a new model engine with the L-head.

Operation by pushrod is in a majority, the overhead camshaft only being used where cost is not a matter of primary consideration.

The Mathis and the Rolland-Pilain present examples of radiator fan driven off the front end of the camshaft. Vermorel, on a new overhead camshaft engine, drives the fan by friction by toothless bevel from the vertical shaft operating the overhead camshaft.

Enclosing Engine Accessories

There is a growing tendency not only to enclose the engine accessories but also to simplify engine lines by extending the crankcase webs up to the frame



The two-stage steering gear of the Fiat. The column telescopes and can be locked in three different positions

members. This was limited a couple of years ago to high grade models, but it is a practice which is now found on some of the cheaper cars. Fiat has one of the best examples of this.

Rolland-Pilain has a new dash arrangement forming an airtight connection with the slab-top engine base, and inspection lamps on the front of it to left and right of the engine. Two battery boxes are recessed in the hollow dash; they are visible from the driver's seat and are lifted out from under the hood.

Full pressure lubrication through a hollow crankshaft has gained considerable ground. On two of the new Chenard-Walcker models a modified type of dry sump lubrication is used, with two oil pumps, mounted on one shaft. The aluminum underpan, the full length of the engine, forms an oil radiator. One pump is used for passing the oil through the radiator and the other for distributing it under pressure to the bearings.

Lubrication of the Vermorel

On a new Vermorel, designed by Engineer Gremillon, formerly of Peugeot racing department, two oil pumps are used, one delivering to the main bearings and the other to the overhead valve gear.

Delage is also using two pumps on a high-grade six, one of these draining the engine base chamber and filtering the oil, and the other delivering it under pressure to the bearings. The influence of racing can be seen here, but it has not been thought necessary, as on pure racing cars, to make the oil reservoir entirely independent of the engine.

Another case of the influence of racing is the Chenard-Walcker system of securing ignition advance by rotating the magneto armature.

Fiat has adopted a new type of two-stage steering gear with a telescopic steering column inclined at 190 degrees. The steering gear box is mounted on a cast aluminum dash bolted to the main frame members and connects by a vertical shaft and steel disc couplings to the main steering arm having spherical connection to the drag link.

Steering Gear Back of Engine

This design places the whole of the steering gear back of the engine and permits of a very considerable inclination of the steering column. In addition, the shaft on which the steering wheel is mounted being telescopic, can be pushed right down to facilitate entering or leaving the driving seat and it can be locked in three different positions by means of a hand lever. The gas and main jet controls are on the top of the main column, only the ignition lever being on the steering wheel.

Balloon tires are shown by 29 different makers. While a few of these have adopted this type of tire as standard, the majority make it optional, at an extra cost.

Announcements From the Passenger Car Manufacturers

Permanent Top Features New Model by Gardner

A standard touring car, equipped with a special permanent top incorporating many features of the enclosed paneled body, and easily convertible into an open top for summer driving, is the latest addition to the line of the Gardner Motor Co. The price of the new model is \$1095 f. o. b. St. Louis.

To Compete With Closed Cars

In making this addition to its line the Gardner company has taken the pains to offset complaints made against temporary winter tops for touring cars and is making effort to establish the new model as a competitor for closed cars at a price within reach of those who have heretofore refused to buy a closed car on account of the price.

The winter enclosure is fitted to the standard touring car body in the same manner as the standard touring car cape top. The roof is of slat construction with lightweight hardwood slats running lengthwise supported by seven crosswise bows. The outside frame of the roof and the crossbows are of light laminated material. The weight of the top is little in excess of the regular touring car top, it is stated.

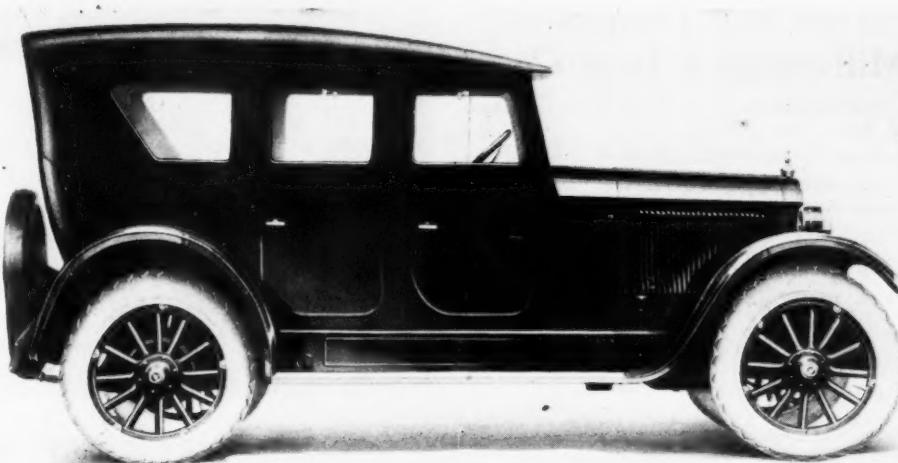
A black rubberized double texture material covers the roof. The rear quarters and back stays are supported with three ply buckram. The roof is lined with a tan colored material.

An aluminum guttering, finished in black enamel, extends the full length of the side quarters and around the front, serving as a drain.

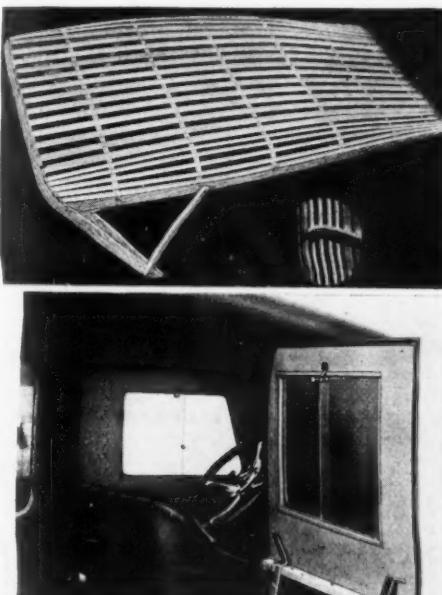
Two Sets of Curtains

Two sets of curtains are supplied, those for the regular summer touring car and the winter enclosure. The glass used is of generous size. This glass in the sides and doors slides back and forth and is held in place with an anti-rattle device.

The curtains are prevented from sagging at the top by an angle iron 1/16 in. thick which is fastened to the frame of the roof, extending the full length of the



The new Gardner all-season touring model with permanent top and winter inclosure. The car sells for \$1095



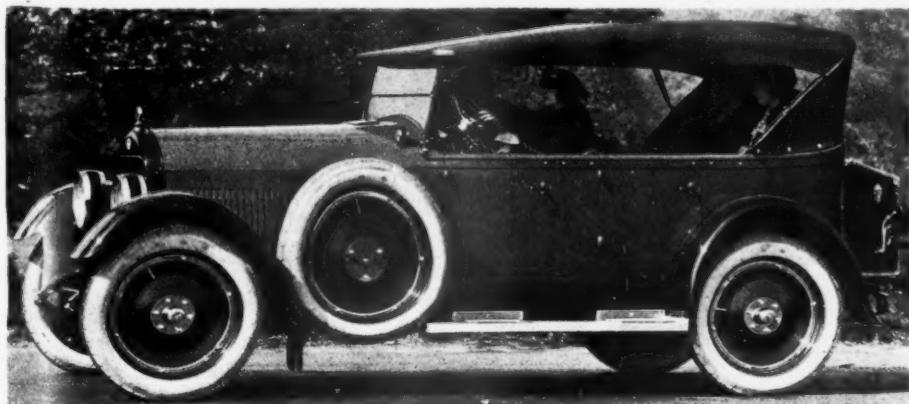
Lightweight slat roof construction of the Gardner all-season top. One of the doors, showing the sliding glass window with anti-rattle device at top

side quarters and adding rigidity to the top.

Seek Foreign Drivers for Opening of Racing Season

LOS ANGELES, Nov. 3.—An attempt is being made to bring about a foreign invasion for the winter racing season which will open here with the annual Thanksgiving day event at the Beverly Hills speedway. According to A. M. Young, racing manager, it is certain that Martin de Alzaga, the Spaniard, will be here. His car already has arrived. Count Zborowski, the Pole, is another entry regarded as sure. Pietro Bordino probably will bring his Fiat winner over, as he drove last year and promised to return. If he does not get here for next month's event he is an almost certain starter in the race on Washington's birthday. Young also is seeking the entry of an English car.

Local racing followers were interested deeply in the announcement that Ralph De Palma will be here with the latest racing creation from the shops of Fred Duesenberg. The rewarding to Jimmy Murphy of the points he earned in the championship contest previous to going to Europe was a popular move with local fans.

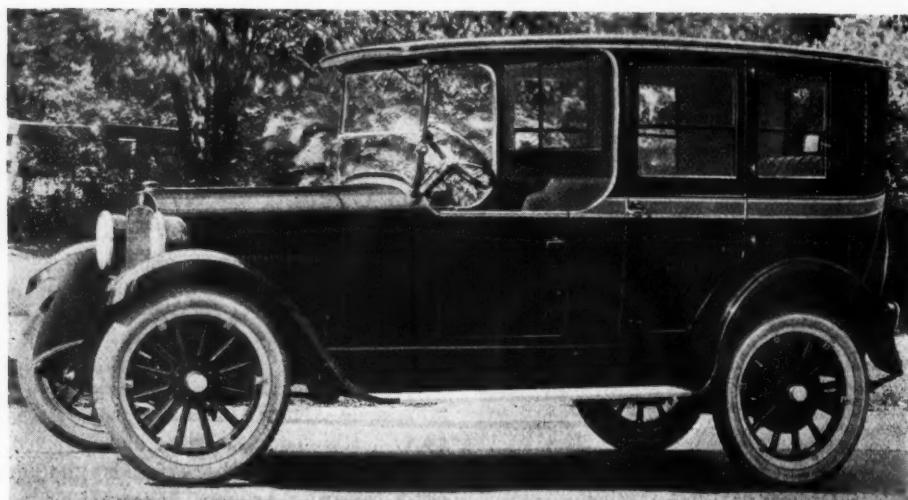
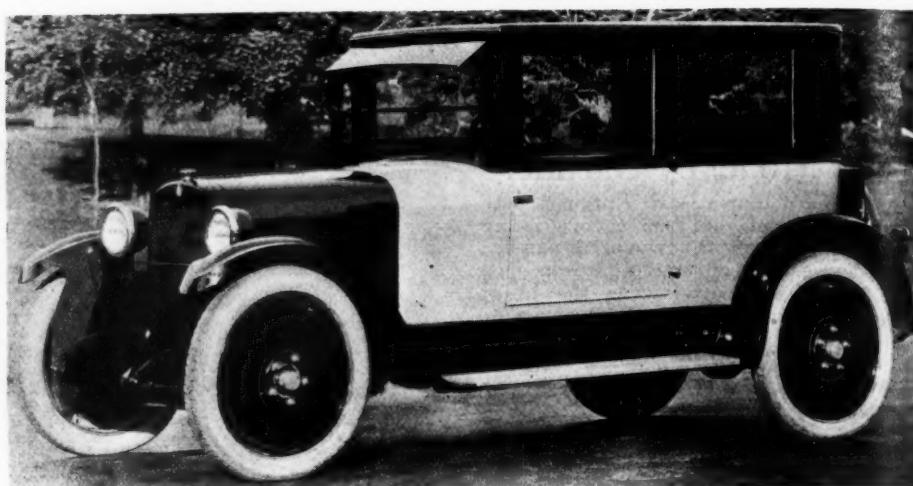


Stutz Announces 5-Passenger Tourabout

Six disc wheels and six oversize cord tires are standard equipment on the Stutz Tourabout, shown at left. The truck in addition to carrying two suit cases has a compartment for raincoats, goggles, top boot, etc. The car is completely equipped and comes in maroon, Brewster green, cobalt blue and Fleetwood blue. Running boards, splash aprons and fenders are black

Two New Products of Millspaugh & Irish Corp.

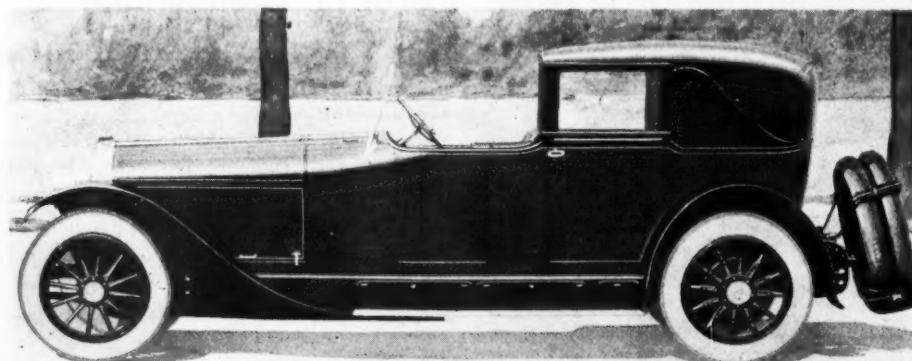
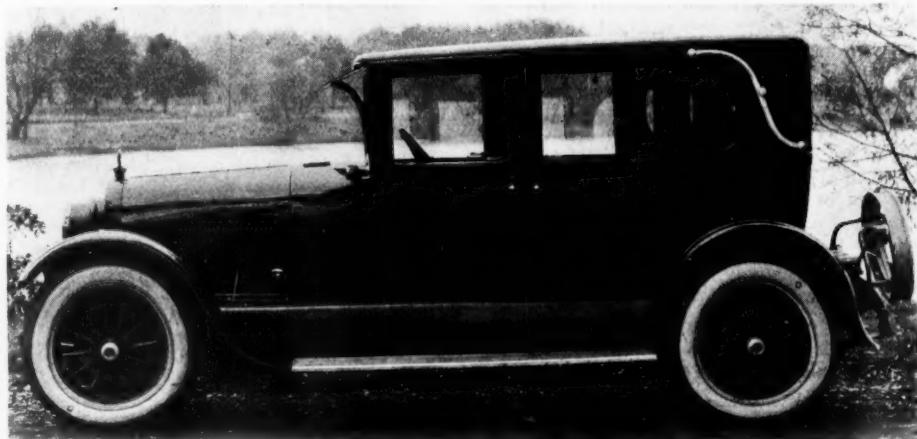
The brougham body which the Millspaugh & Irish Corp., Indianapolis, Ind., has developed for the Dodge Brothers chassis. The front seats of the brougham are of the bucket type with coil back and cushion springs. A heater is furnished. Upholstery is in heavy blue cloth, while hardware is bright nickel finish.



The taxicab body simply bolts to the chassis and makes use of the hood, windshield and front doors that are integral with the chassis as handled by all Dodge distributors.

Town Brougham—New Peerless Model

The new Peerless five-passenger town brougham. It is finished in blue, with mohair-velvet upholstery. There are two doors on each side.



Locomobile Special Cabriolet

LOCOMOBILE is showing two different models of the collapsible cabriolet at the fall shows. This body, designed by LeBaron, built to individual order, is something of a departure from standard Locomobile lines. The body-side is high and the belt-line has been raised even more at the rear door line, giving a low appearance to the car.

Engineering for the Service Man

No. 6

How to Read Horsepower and Torque Curves

Preceding articles in this series were published July 19, August 9, August 30, September 20, and October 11, 1923.

WHEN an engineer wants to know how much power a certain engine develops or at what speed that particular engine shows its best pulling power he asks to see the "curves."

Many maintenance men imagine that curves are something only to be used by engineers. This is not so. The business man of today plots a curve of his business. The weather forecaster plots a curve to show how the temperature or amount of rainfall varied over the period of 12 months. Curves tell stories. They offer pictures which the mind can take in at a glance. They offer comparison. They are useful in practically every branch of industry.

A Practical Use

Now supposing a concern brought out a new engine and tried to sell it to car makers, truck makers or anyone else. It would have to tell these concerns that the engine develops so much horsepower and has so many foot pounds of torque at certain speeds.

The engine will previously have been put on a test block run at different speeds and the results of these tests are written down, so that a curve can be drawn or plotted, as it is commonly called. The curve is a definite record of what the engine has accomplished and upon which a designer may base his future calculations.

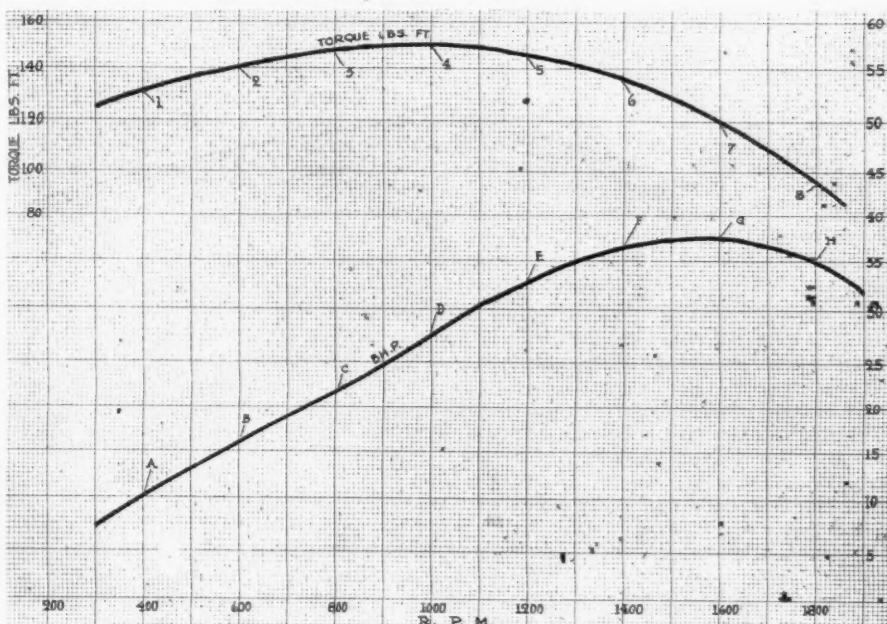
Curves are not difficult to read. Let's take a typical case of plotting a curve. Let us assume we have built an engine and placed it upon a test block. It has been run at various speeds and we have placed different loads upon it to see how the engine pulled these loads. Of course, there are instruments to measure the power output, a tachometer or revolution counter to tell us how fast the engine is turning over and a scale to measure the torque. Torque, you will remember, was explained in number five article of this series.

Here's an Example

Let us assume the engine has been run and we have jotted down the various figures obtained. Then we proceed with the curves.

We take a sheet of paper, commonly called cross-section paper. This is simply a sheet with lines drawn at right angles, so that we have a series of squares. For convenience these usually are laid off so that every fifth line, both horizontal and vertical, is slightly heavier and every tenth line is still heavier.

At the bottom of the sheet we place the revolutions per minute, starting with 200 at the lower lefthand corner and placing the figures 400, 600, etc., at regular intervals, as shown. Each small square will then represent 10, but obviously it is not necessary to write down a figure for each small division.



Typical horsepower and torque curves of an engine. Curves like these help one to quickly visualize the performance of an engine. Thus from the above we see immediately that the best pulling power or torque of this engine comes at a speed of 1000 r.p.m.

At the right of the sheet and running vertically, we place the horsepower figures, beginning with 5 and proceeding regularly with 10, 15, 20, etc., until we have reached a figure to cover the range of power the engine is likely to develop.

Plotting the Curve

Now let us suppose that our records from the engine test show that when the engine was running at 400 r.p.m. (revolutions per minute) it developed, according to the measuring instruments, 10 horsepower. We take a pencil and make a dot at the point A, which it will be noted is placed at the intersection of the lines representing 400 r.p.m. and 10 h.p.

Also let us suppose the records show the engine developed 17 h.p. at 600 r.p.m. Just as before, we make a dot at point B. Further investigation of the records show that at speeds of 800, 1000, 1200, 1400, 1600 and 1800, the engine developed respectively the following horsepower: 22, 27.5, 33, 36, 37 and 35. Then it is only necessary to establish the dots C, D, E, F, G and H on the chart.

This gives us a series of dots ranging from A to H. It now is only necessary to draw a line through these dots and we get the curve, known as the horsepower curve.

From this curve a person can tell exactly at what speed the engine develops its greatest power. Thus in the curve we have drawn the engine shows its best power at a speed of 1600 r.p.m.

because it is here that the engine "peaks." It is the highest point or "peak" in the curve and that is why you often hear the expression that a certain engine "peaks" at 1400 or 1600, as the case may be.

Having developed the curve, we see that there is a falling off in power of the engine after 1600 r.p.m., so that at 1800 r.p.m. we are developing only 35 h.p. as against 37 h.p. at 1600 r.p.m. The reason for this falling off in power need not be discussed here, as it was explained in the previous article on "torque."

Having plotted a horsepower curve for our engine, we can proceed to plot the torque curve on the same sheet. It is desirable to do this because we then can compare both horsepower and torque at given engine speeds. The torque curve may be plotted at any convenient place on the chart, usually just above the horsepower curve.

Then the Torque Curve

As was stated in the previous article on torque, the latter is measured in foot pounds. Assuming that our records of the engine test show that the engine develops 132 ft. lbs. torque at 400 r.p.m. we place the dot 1, as shown. It will be noted that the figures at the left of the torque curve represent the foot pounds of torque in just the same manner as the horsepower figures at the right of the horsepower curve.

At point 2 we place a dot to represent 142 ft. lbs. torque at 600 r.p.m., assuming that the records of the engine test

showed this to be the case. As with the horsepower curve, we proceed regularly with dots 3, 4, 5, 6, 7 and 8 to represent respectively 148, 150, 145, 135, 120 and 94 foot pounds of torque. These dots are established on the revolutions per minute figures of 800, 1000, 1200, 1400, 1600 and 1800. The torque curve can then be drawn through the dots as with the horsepower curve.

Now, the beauty of having these two curves in the position shown is that we have established a picture of just what that engine can do. We can see at a glance that the best pulling power of that engine comes, not at its "peak" but at 1000 r.p.m., where it develops ac-

cording to our torque curve 150 ft. lbs. of torque, or turning effort.

Other comparisons can be made. For an example, suppose we wished to try out a certain device on the engine and wonder if the device would give the engine more power at certain points.

The device is installed and the engine is then tested as before. The results are plotted in the form of a curve just as before and comparison made. Perhaps the new curve shows that at 800 r.p.m. and speeds under this the engine developed more power, or vice versa. Thus we get a comparative picture of the effect of the device.

DEALERS IN FALL SHOW

MACON, Ga., Nov. 3.—Practically all automotive dealers in Macon took part this year in the annual Macon fall automobile show held in connection with the Georgia State Fair the latter part of October, the show this year proving much larger than usual, with considerably more cars on display and a larger number of exhibitors. It was, in fact, the largest automobile show that had ever been held in the Macon territory, and was under the direction of the Macon Automobile Dealers' Association.

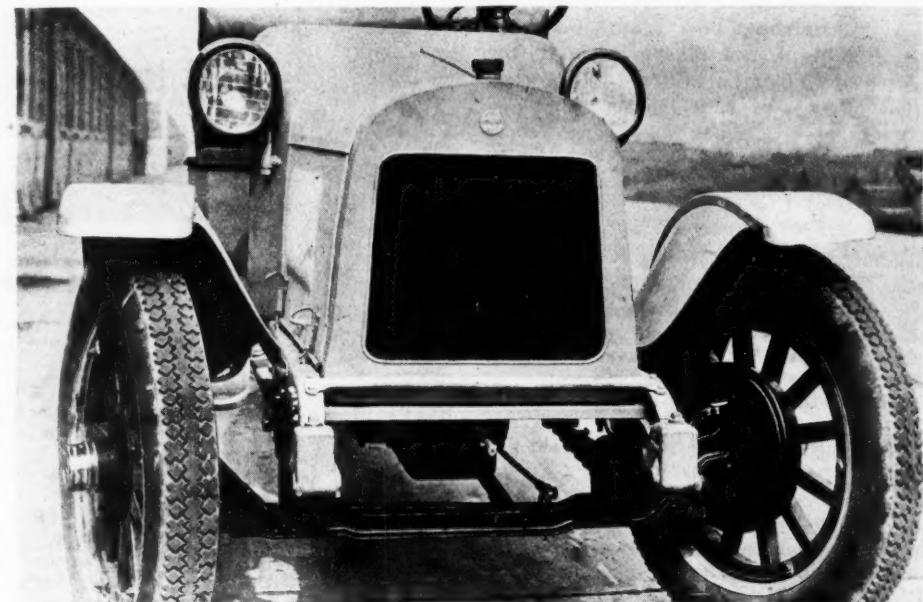
Bethlehem Truck Introduces Model With Four Wheel Brakes

THE first truck maker to announce front wheel brakes in addition to rear wheel brakes is Bethlehem Motors Corp.

The front axle is the reverse Elliott type with the usual I section at its center. The pivot pin is inclined, and the wheel spindle is slanted downwards $1\frac{1}{2}$ degrees from the horizontal, giving substantially center point steering. An operating shaft, carried on the axle center, has threaded ends which move in internally threaded sleeves that force these sleeves in or out and actuate the brake mechanism.

The brakes are of the two-shoe expanding type and self-equalizing. The shoes are separately hinged to an anchorage, which is bolted to the knuckle forging. The brake shoes are operated by means of a toggle at the bottom, which is in turn actuated by a yoke, and the stem of which is fitted concentrically into the knuckle pivot pin and is free to rotate and slide axially therein.

Bearing against the yoke boss and straddling its stem is a lever pivoted at the axle center. This lever is operated by a second lever—the lower end of this second lever bears against a slot in the shaft sleeve referred to above. The shaft



Bethlehem truck with front wheel brake installation. The operating rod is visible just below the radiator

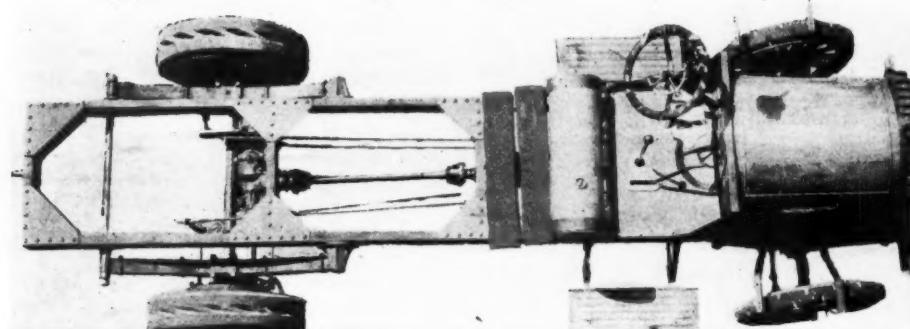
and shaft sleeve are free to move longitudinally, which equalizes pressure on levers at both ends.

Wheel brakes are fully enclosed, but readily accessible for adjustment, it is

stated.

The axle is completely oil lubricated, of special Bethlehem design, and fed by an auxiliary supply of oil through the Bethlehem high pressure oil gun system.

Eagle Motor Truck Corporation Brings Out New 2-Ton Model



Top view of the Eagle 2-ton truck chassis, showing the exceptionally large gusset plates used on the frame

A NEW model 2-ton truck has been brought out by the Eagle Motor Truck Corp., St. Louis, Mo., in which ef-

fort has been made to provide a large factor of safety as to carrying capacity. While the truck normally is listed as a

2-tonner, it will, nevertheless, safely take a load of 4 tons, it is stated.

Four thousand square inches of cooling surface has been added to the radiator of this model. All malleable iron castings have been replaced with ones of electric steel or drop forged steel. The former model CTU Buda engine has been replaced with a model GTU, which has a $\frac{1}{4}$ in. larger bore.

A feature appealing to the driver is the cantilever foot brake whereby only a little pressure of the foot is required to apply maximum pressure on the brake drums. This has been accomplished by changes in the brake layout between the pedal and drums, the latter being the same size as formerly used.

A low gear ratio Ross starting gear has been provided, said to greatly lessen road shocks.

What the Maintenance Man Should Know About Four Wheel Brakes

Design, Construction Features and Adjustments of Front Wheel Brakes as Used by American Car Makers. How the Brakes Are Equalized

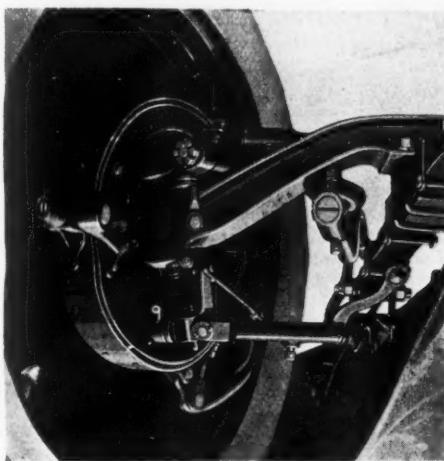
By B. M. IKERT

IN THE belief that the maintenance man will be called upon this winter to install, inspect and adjust various makes of front-wheel brakes, MOTOR AGE presented in last week's Annual Winter Service Number, a practical summing up of the high spots thus far brought to light in the matter of braking on all four wheels. In the following article, a continuation of the one last week, the design and adjustment features of the cars equipped with four wheel brakes is taken up.

Buick

The brakes on both front and rear wheels are mechanically operated and are applied by pedal. They are equalized in pairs, that is, the pull to the rear brakes is equalized with the pull to the front brakes, but the right and left brakes on the front and rear are not equalized individually.

Application of the four-wheel brakes is through the pedal to the equalizer which transmits the pull to a cross shaft



Buick front wheel brake which is of the external contracting type

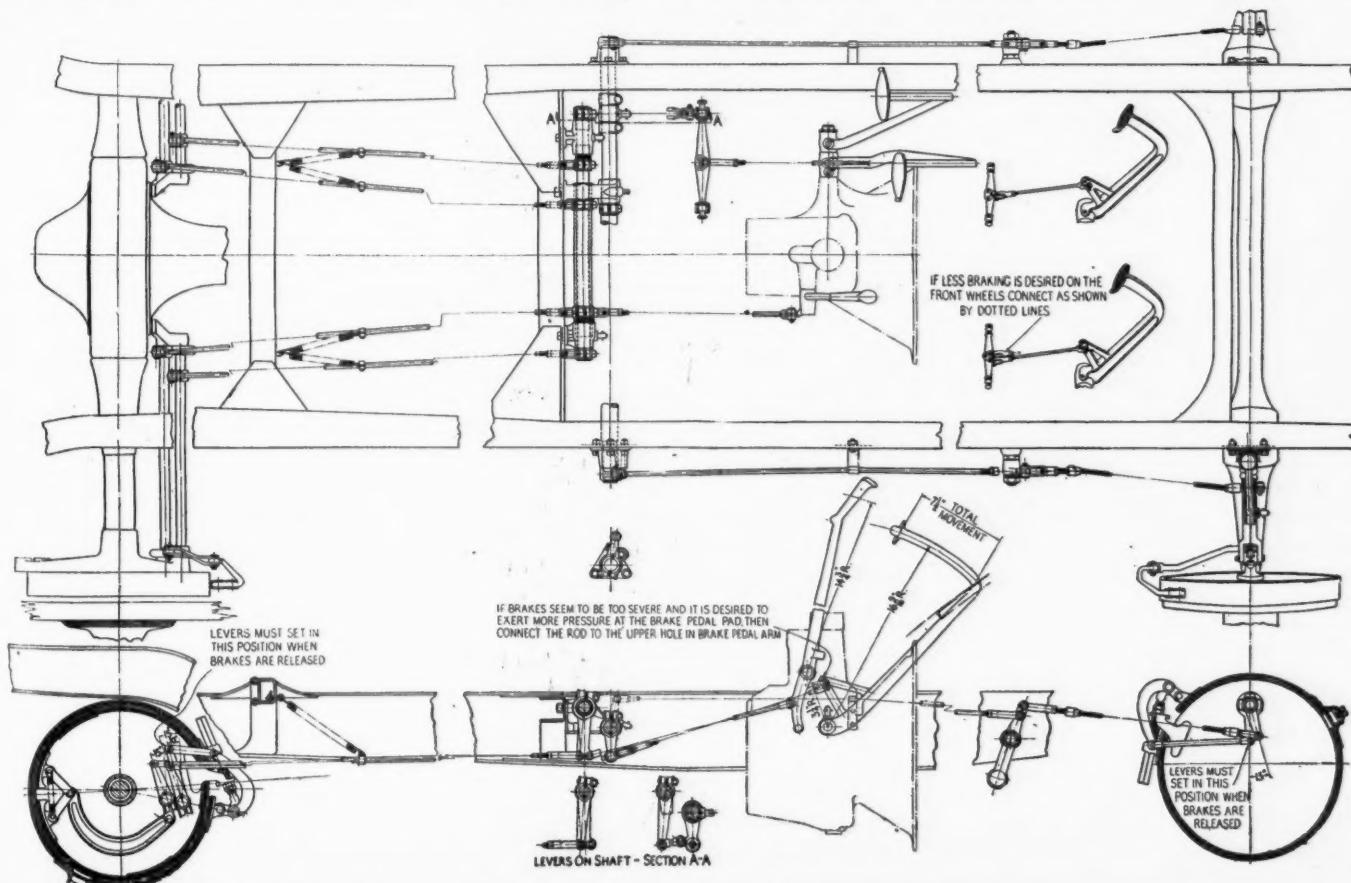
for the front wheel brakes and another cross shaft for the rear wheel brakes. From these two shafts pull rods extend forward outside the frame to short cables

which operate the front brakes, while the rear brakes are operated by the usual rods inside the frame. The foot brakes themselves are of the external contracting type which gives a wrapping action. The brake band assemblies are interchangeable on all four wheels and the brake anchor is so located as to give a three-quarter wrap when the car is running forward.

How Leverage Is Divided

The brake operating linkage is such that the leverage is greater on the rear brakes than on the front, the proportion being about 55 per cent for the rear brakes and 45 for the front. There is an adjustment, however, by means of which the relative leverage from the brake pedal to the front and rear brakes can be altered. In case it should be desired, however, to change this relationship, the pull rod can be connected to other eyes in the equalizer bar.

The front brake pull rods apply the brakes through levers on short shafts



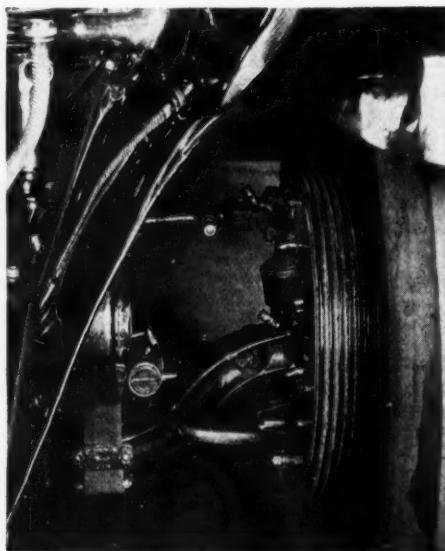
General layout and adjustment features of the Buick four-wheel brake system

with slip joints at their inner ends and universal joints on their outer ends. The brake toggles are operated by secondary levers at the outer ends of these short shafts and links connecting to the brake toggles.

The vertical pin in the universal joint at the outer end of the front brake shaft has an axis which is perpendicular while the king pin about which the wheel turns in steering is so inclined that if produced it intersects the central point of contact between tire and ground. This lack of parallelism in the axis produces a relative movement when the wheel is turned and partially disengages the brake on the outside wheel in rounding a curve. This is intended to prevent locking of the outside front wheel in turning a corner and to eliminate the tendency toward front wheel skid under these conditions.

Held Out by Coil Springs

The brakes are normally held out of engagement by coil springs. Adjustments for keeping the brake bands round and free from drag are provided. These adjustments are intended to give the



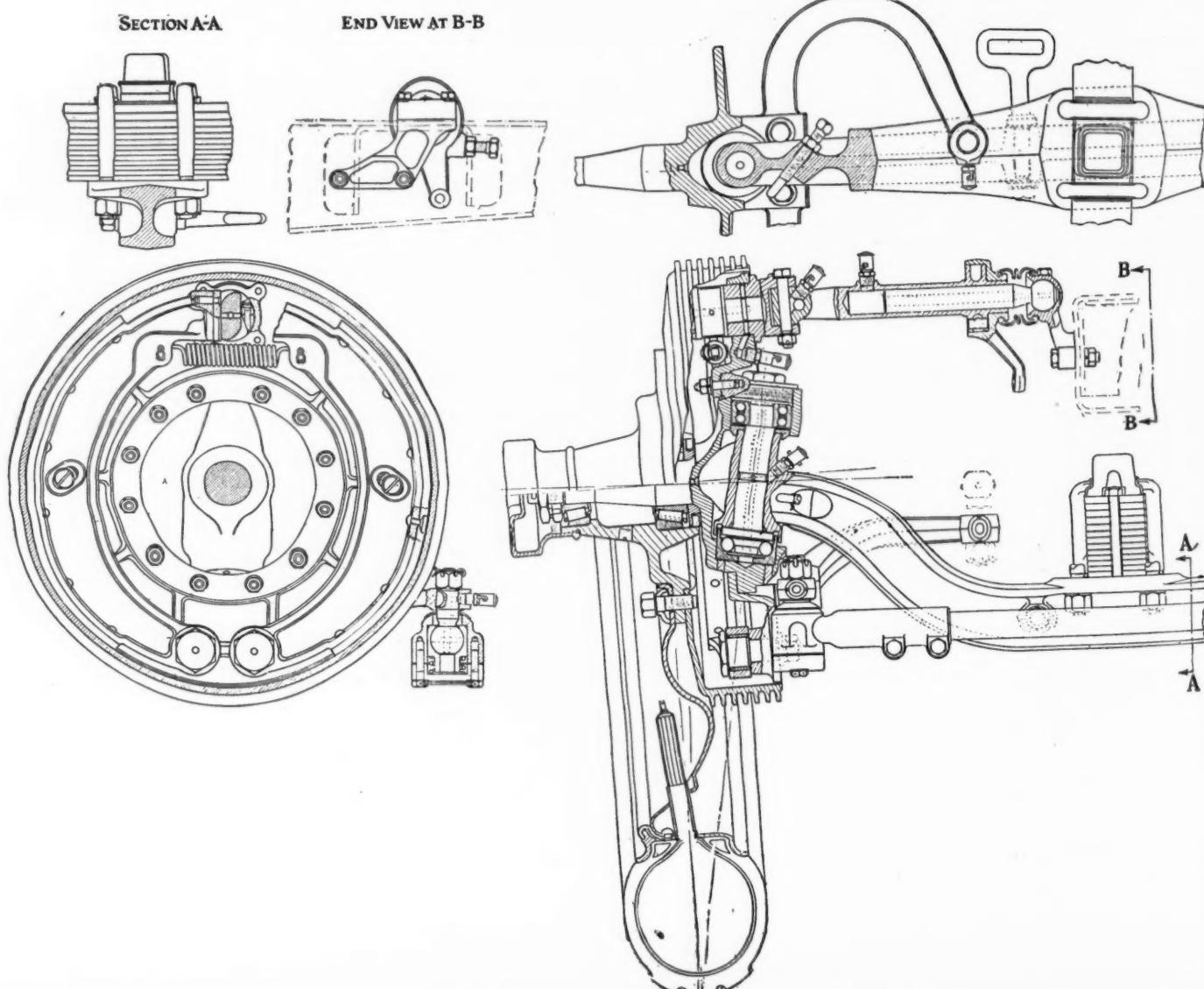
Packard uses an internal expanding front wheel brake. The drums are ribbed for cooling

band a uniform clearance of $1/32$ in. between the lining and the drum when

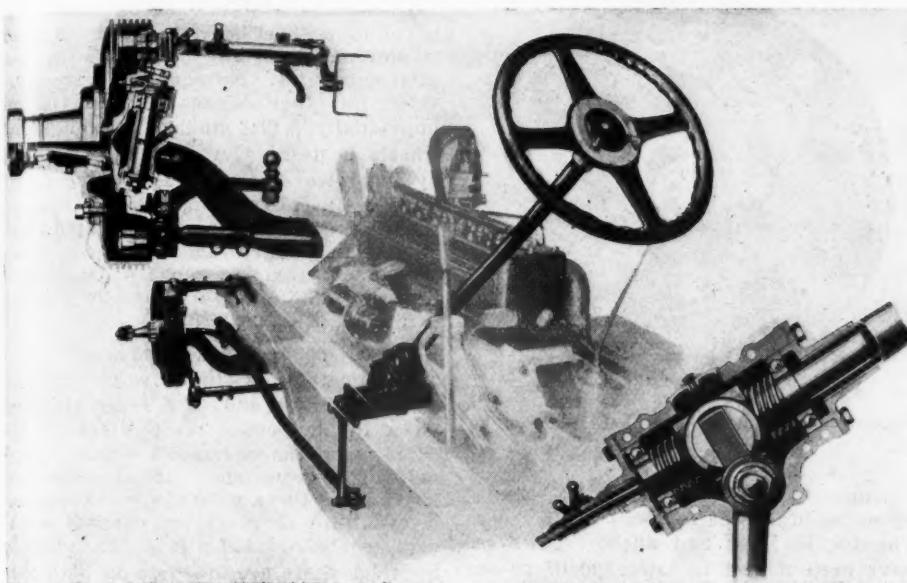
the brakes are released. The hand brake is operated by a lever as heretofore. This lever actuates a set of internal expanding shoes against the rear drums.

Packard

The Packard brakes, which operate on the four wheels simultaneously, are mechanically operated internal expanding shoe type. The brake shoes are cast aluminum faced with wire woven asbestos. When pressure is exerted on the pedal the motion is transmitted to a crank through a planetary gearset which steps up the motion so that the crank moves through 90 deg. for a 26-deg. movement of the pedal. The crank is so positioned that the motion of the cable attached to it is rapid at the start and progressively slower as the pedal is depressed so that the leverage increases correspondingly. The brake cable passes from the crank over a sheave which is supported on the end of a lever fastened to the rear brake equalizing shaft and the outer end of the cable is attached to a second lever which is supported by and anchored to



Detailed views of the Packard front wheel brake system. This clearly shows the manner of inclining the pivot pins and cam mechanism which operates the brakes



Packard steering system, showing its general relation to the front wheel brake mechanism

the front brake equalizer shaft. As the pedal is moved, this cable rotates both equalizer shafts, and serves as an equalizing mean between front and rear brakes.

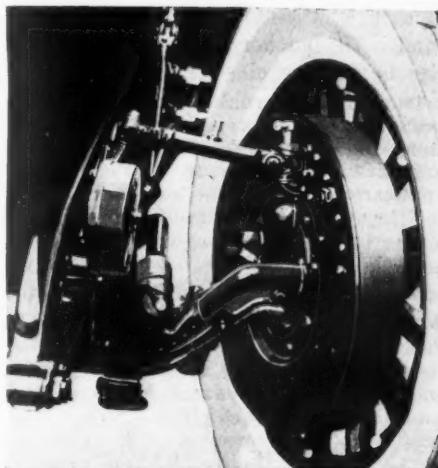
The cable which operates the front wheel brakes is pulled by levers on the forward equalizer shaft, while the rear wheel brakes are actuated by the pull from levers on the rear equalizer shaft. The cable for the front wheel brakes is thus separate from the cable which operates the rear wheel brakes.

Pull on Mechanism Equalized

One end of the front brake cable is attached to the left front wheel brake camshaft lever and the other end to the right front wheel brake camshaft lever. The pull on the brake mechanism is equalized between the two front wheel brakes by this cable which passes over sheaves and through the equalizer shaft or cross tube. For operating the rear brakes, a similar cable equalizing device is used, except that the cable ends are attached to loose intermediate levers on the rearmost brake cross tube, which levers are connected to the rear brake camshaft levers by rods.

As the pedal is depressed, both the front and rear equalizer shafts are rotated, pulling on the respective cables which pass through the equalizing sheaves, consequently not only equaliz-

ing the pull to the front and rear wheel brakes, but also to the individual left and right brakes at the front and rear. At its inner end the front brake camshafts are telescoped over ball ended



Cadillac uses an internal expanding brake, which is fully inclosed

ing the pull to the front and rear wheel brakes, but also to the individual left and right brakes at the front and rear. At its inner end the front brake camshafts are telescoped over ball ended

in steering and any other relative movements between the wheel and chassis.

Operating of Hand Brake

The hand brake lever operates the same rear brakes as are used in the pedal system, through the same rods from the rear cross shaft. When the hand lever is pulled it rotates the cross shaft and with it rigidly attached arms, which pick up the loose levers attached to the rear brake-pull rods. When the foot brake is applied these arms remain stationary and the loose levers are pulled away by the foot brake cable mechanism. When the hand brake is applied, the levers attached to the rear brake shaft pick up the loose levers and apply the rear wheel brakes independently of the front wheels.

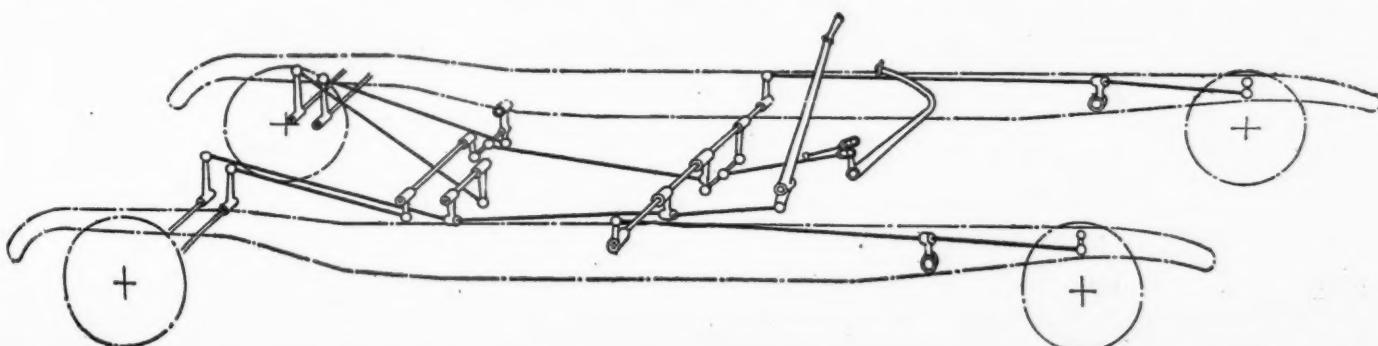
The front axle is designed to take the front wheel brake torque. The steering knuckle pins in this axle are inclined so that the center lines produced meet the ground at the central point of tire contact. The knuckle pin is mounted top and bottom on ball bearings, the upper bearings having two rows of balls and taking radial loads only. The lower bearing, in addition to the radial load, takes the downward thrust of the weight of the front wheels. The front wheels are mounted on tapered roller bearings, and are arranged to toe in $\frac{1}{2}$ in.

Cadillac

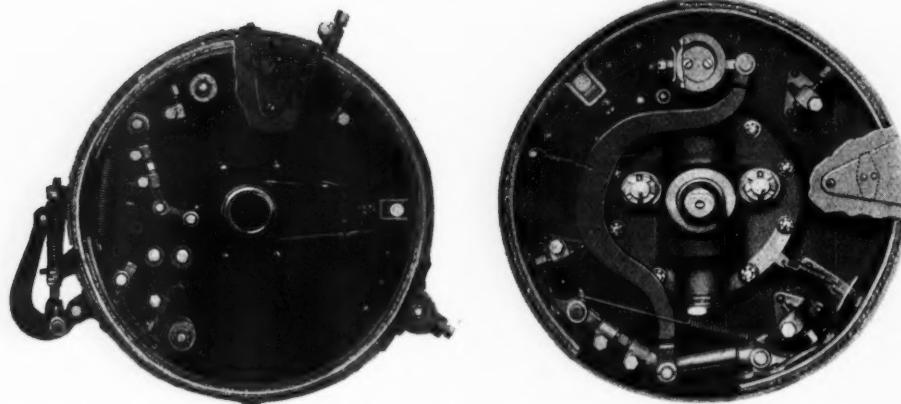
In the Cadillac the braking system consists of three pairs of brakes. The service brakes which operate simultaneously on all four wheels are external on the rear wheels and internal on the front wheels. The emergency or hand brakes are internal on the rear wheels. The hand brake are independent of the foot brakes in all particulars.

The front axle is designed to provide for the additional stresses imposed by front wheel brakes. The tie rod is behind the axle and its joints are of the ball and socket type as required with inclined knuckle pivots.

The four-wheel brakes are so designed that when the brakes are applied with the steering wheel turned to the right or left, only the brake on the inner wheel will take effect, leaving the outer front wheel free to rotate. Similarly, if the car is sliding straight ahead on a slippery surface with both front wheels locked and if the steering wheel is then turned, the outside front brake will



Schematic diagram of the Cadillac four-wheel brake system. This shows the relationship between the front and rear wheel brake operating mechanism



Detailed views of the Cadillac front and rear wheel brakes, the latter being shown at the left

automatically release. The braking effects are so proportioned that the front wheels will not lock until more than enough pressure has been applied to lock the rear wheels. The proportion of the braking effect taken by the front wheels can be adjusted within limits to meet the requirements of different loads or to suit individual preference.

Graduating the Braking Effect

The four-wheel brakes are applied by a pedal which connects through a pull rod to a division bar which performs the function of graduating the braking effect of the front and rear brakes. The division bar is connected by levers to the front and rear cross-shafts which in turn are connected through levers and pull rods to the front and rear brakes. The pull rod connecting the brake pedal to the division bar has two engaging eyes. The first eye is nearer the pedal shaft and consequently has a greater leverage than the second. The connections are so adjusted that during the first part of the pedal travel the brakes are applied through the connection nearest the pedal shaft, giving application of the brakes with light foot pressure. When the brake lining is worn, so that the pedal is within a short distance of the toe board, the upper connection takes effect and the rate of pedal travel is reduced. The result of this two-stage construction is that the brakes can be used for a much longer time before the pedal touches the toe board and adjustments are needed less frequently. At the same time, the change in leverage denotes to the driver that the second stage has been reached and that adjustments must be made in the near future.

The rear wheel external brakes are

essentially the same as in the corresponding brakes on former Cadillac cars. The toggle lever and anchor, however, have been moved to lower positions on the brake bands to give a greater length of the band above the drum. This increases the wrapping effect of the upper part of the band and is another factor in making the rear brakes more effective than the front, which are of the expanding type. A stop screw has been added above each external brake to preserve a uniform clearance throughout the increased length of the upper part of the band. The anchor adjusting screw has also been made of self-locking.

The front internal brakes are of the expanding toggle type, similar in principle to previous rear wheel internal brakes but differing in the method of application. As in the external brakes, the location of the anchor in relation to the toggle makes use of the wrapping action. Provision has been made for protecting the front wheel brakes from the weather. The brake drum overlaps the edge of the dust shield in an angle-shaped projection to automatically catch and throw off any water or dirt which may pass the dust shield.

Mounting of Equalizer

The equalizer for the rear wheel brake is suspended from the frame cross-member opposite the front end of the rear springs. It is so located that the rods between it and the brakes pivot about approximately the same axis as the rear springs. A rocker shaft for the rear wheel internal brakes is provided on the same cross member to which the rear wheel external brake equalizer is attached.

Oakland

The four-wheel braking system adopted is different from any other now in use in this country. No equalizers are provided, all four brakes being adjusted individually. The linkage to the front wheels is designed to eliminate locking by the release of pressure at the front brakes. In conjunction with this feature the rear springs. It is so located that actuate the front brakes are offset from the knuckle axis to cause an increased release of the outer brake while making a turn.

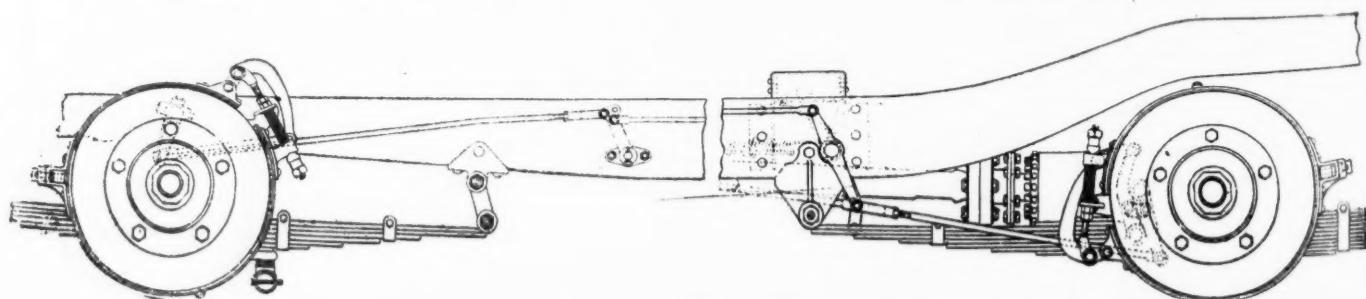
A rod connects the pedal lever, of approximately 13 in. effective radius, with the lower end of a lever clamped on a tubular cross shaft which is located under the intermediate cross channel. The cross shaft is supported in bearings at three points, a bracket being riveted into the inverted channel adjacent to the operating lever, in addition to which there are brackets on both side channels. Double ended levers are mounted at the end of the cross shaft, the upper end operating the front brakes through a linkage, while the lower end is connected by a link to an intermediate lever mounted on the rear axle. Although the two ends of the lever on the cross shaft are of different lengths, owing to the change in leverage by the intermediate lever arms the pull on all brake band levers is the same.

Linkage Located Outside Frame

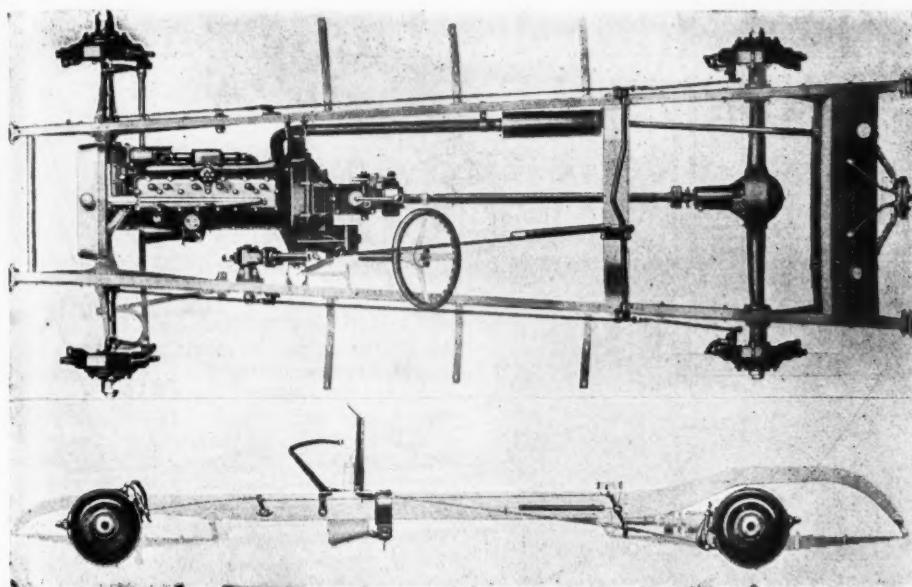
All of the brake operating linkage, with the exception of the first link and the cross shaft, is located outside the frame but is concealed by the shroud between the running board and body. External band brakes are used at all four wheels, the outside diameter of the drums being 12 1/4 in. and the width of bands, 1 1/8 in.

The intermediate lever at the rear end together with the rest of the brake mechanism is carried on a stamped steel plate and is connected by a short pressed steel link to another lever which in turn operates the brake band clamping lever through another pressed steel link. The usual release spring and hand adjustment are located in front of the axle. A support in the form of a slotted eye belt takes the reaction of the releasing spring and tends to prevent rattling. Additional radial releasing springs are provided in the anchor bracket and two auxiliary supports.

From the upper end of the cross shaft lever, a link having an integral clevis at each end extends forward to an inter-



Front and rear wheel brake hook-up used on Oakland. Most of the linkage is located on the outside of the frame



Plan view of the Oakland braking system. This shows the operating rods on the outside of the frame

mediate idler lever which is carried on a bracket riveted to the side channel alongside of the rear pair of cylinders. For the sake of simplicity only one side will be described. Another link with a ball at the front and a threaded yoke at the rear end connects this idler lever with the inner brake operating lever of the floating connection between the frame and the front axle.

Construction of Universal Joint

The lower leg of the outer fork of the universal joint is extended to form a lever which extends downward and operates the brake band clamp lever throughout an intermediate link. This fork is forged at the inner end of a short shaft which has its bearing in a bracket riveted into the stamped steel brake carrier and cover. A helical spring surrounds this bracket, and, because of its application to a washer at the end of the short shaft, serves to prevent rattling and returns the lever to the release position. Beyond the clamping lever, the details of the brake are substantially the same as those of the rear construction, except that the anchor location is moved to provide a five-eighths wrap

Inclined Steering Pivot

The center of rotation of the universal joint is slightly offset from the axis of the steering pivot, the latter being inclined so that its axis strikes the ground $\frac{3}{4}$ in. inside of the center of the tread. The operation in different planes results in a slight relative motion of the brake operating linkage as the wheel is moved around. This motion tends to release the outer brake while turning a corner and therefore eliminates the possibility of sliding straight ahead due to a locked outer wheel.

Locking of the front wheels is prevented in a novel way. Application of any front wheel brake transfers weight to the front axle and this increase in weight naturally causes an increased deflection of the front springs. In this design, the link connecting the idler lever at the side of the rear cylinders to the inner lever at the front end slopes downwardly at a considerable angle from rear to front. As the springs compress, this link swings upward about its rear center and tends to release the inner operating lever and, consequently, the brake, by a slight amount. It is for this reason the front brake bands are given an increased wrap as this compensates for the slight decrease in tension on the band during normal application of the brakes.

The same feature holds good when the brakes are fully applied suddenly. As there is no equalizer in the system the maximum travel of the pedal is limited by the contact of the rear bands as well as those in front. The transfer of weight increases the deflection of the front springs and simultaneously decreases the front braking moment, in consequence of which the front wheels may approach but never attain a locked condition. The included angle between the inner operating lever and the brake rod is the determining factor rather than the angle between the rod and the frame, a slight angular movement of the rod

bringing about a very appreciable movement of the brake lever. The makers state that this system has shown excellent handling qualities with any reasonable brake adjustment. The line of action of the front springs is inclined slightly toward the vertical. This angular travel in opposition to the brake rod insures the releasing action.

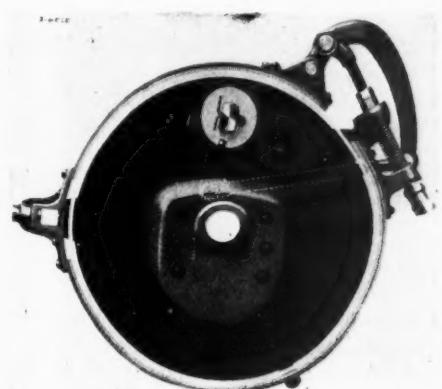
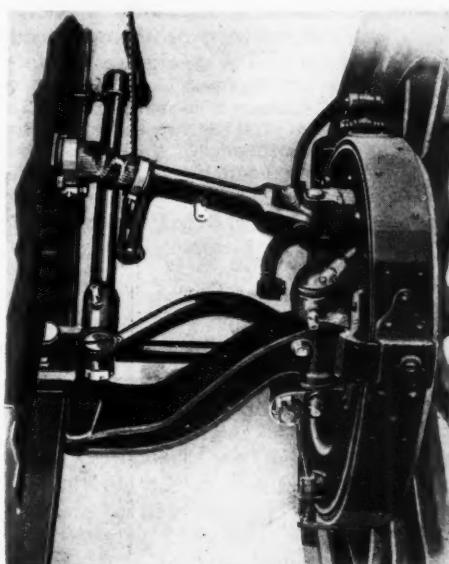
Marmon

The Marmon front wheel brakes which are offered as optional equipment are of the internal expanding type. The band rests upon three supports attached to the brake carrier and is held out of engagement with the drum by three springs. Each support is adjustable so that the clearance between the drum and band can be varied. The lower end of the band assembly is connected through a link to the brake carrier and the upper end of the band is acted upon by a lever arm.

Arm Operated by Cross Shaft

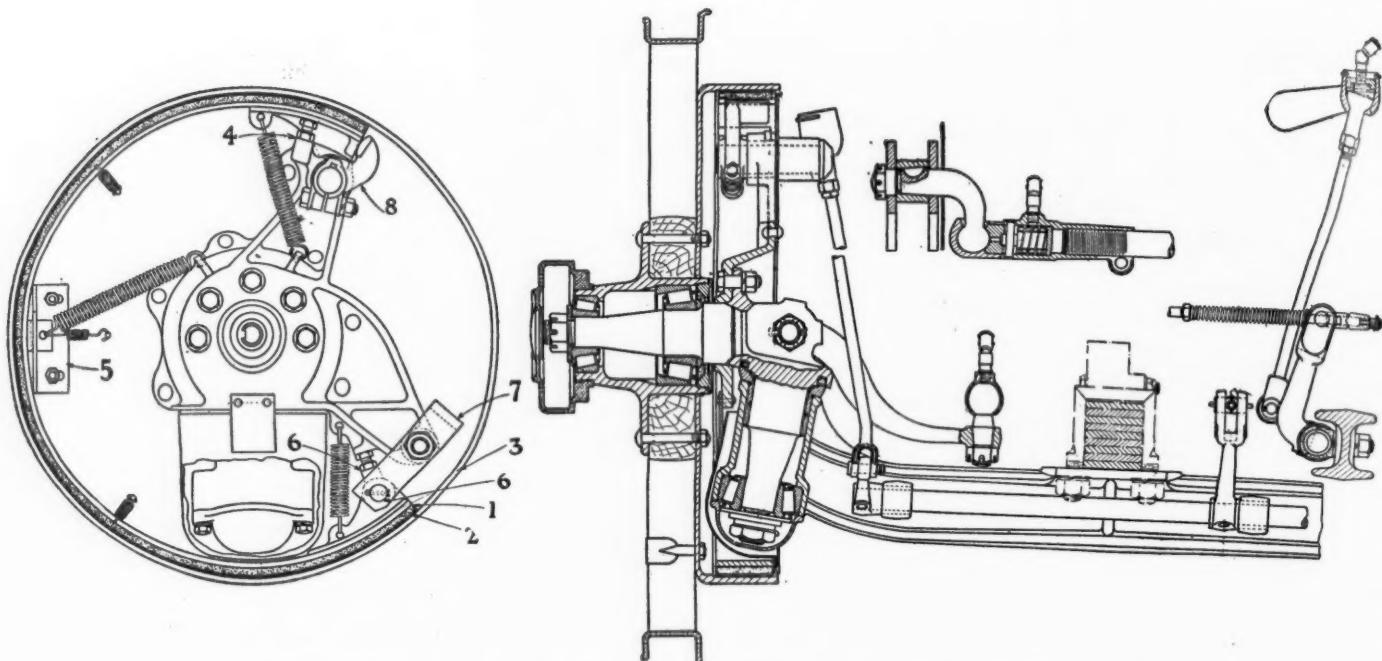
This lever arm is keyed to a shaft which extends through the brake carrier and dust shield, and whose outer end forms a crank arm for connecting the control linkage. When the brake pedal is depressed it causes the arm to force the brake band outward into contact with the inside of the brake drum. The pressure between the band and the drum is partly due to the pressure on the pedal and partly to the tendency of the band to rotate with the drum, or to what is known as the wrapping effect.

The lever arm terminates externally in a crank arm. This arm is operated by a cross shaft which lies within the rear channel of the front axle I-beam and is supported by it in self-lubricating bearings. The ends of the cross shaft are connected to the crankarms on the left and right brakes, through levers and links. The upper end of the links terminates in a ball and socket joint entirely inclosed and provided with a lubrication fitting. The ball end is



Close up of the Oakland brake, all four of which are interchangeable

All four brakes on the Oakland are adjusted individually, no equalizers being used



Front wheel brakes as designed by Marmon. The novel operating means is clearly shown

threaded and provided with a lock nut serving as an adjustment for equalizing the left and right front brakes.

The center of the ball joint lies in the axis of the steering knuckle pin so that

the steering action causes no motion of the brake mechanism and the application of the brakes is not affected. The braking effect of the front-wheel brakes can be changed in relation to that of the

rear-wheel brakes by turning a nut on the end of the rod which attaches to the lever of the cross shaft on the axle I-beam, thereby increasing or decreasing the effective length of the brake rod.

23 Years Ago This Week In Motor Age

(From Motor Age of Nov. 8, 1900).

NEW YORK AUTOMOBILE SHOW

NEW YORK, Nov. 5.—Never did the opening day of bicycle or automobile show develop a more pleasing surprise than Saturday's commencement of the Madison Square Garden automobile exhibition under the direction of the Automobile Club of America.

The general view of the main floor presented that array of color and grouping which gains favor with the onlooker; it brought out all the spectacular brightness typical of Madison Square Garden exhibitions, rendered more striking in pictorial effect by the absence on the floor of the multitude of small displays of small objects which gave the bicycle shows of the past a look of cheerful ineptitude when viewed as a whole.

Visitors Were Given Rides

The arrangement of the garden was excellent. Around the main floor a track about 20 feet wide and slightly banked at the turns had been laid. The space within this was given over to the main exhibit . . . On account of the small size of the track and its low banking speeding upon it was prohibited, it being devoted entirely to the showing off of the various vehicles and to obstacle contests which have been arranged for the afternoon and evening programs of the week. Saturday's business was entirely that of letting the visitors to the

exhibition see the different automobiles, ride in those run on the track and become acquainted with the manufacturers.

Exhibits Include Curios

The Automobile Club of America under whose auspices the show is being held, has arranged in the annex an interesting loan exhibit of curios in automobile building. It includes the following:

Richard Dudgeon's steam carriage, built in 1855 but destroyed in the Crystal Palace fire.

Riker electric racing carriage, which won the Blanchet cup in a 55-mile road race in 2:03:30.

S. T. Davis' steam racing car built by the Locomobile Co. of America.

Walking automaton pushing wheel chair. Driven by electricity. Built by George R. Moore of Westford, Mass., in 1891.

Voiturette owned by Albert R. Shattuck, president of the Automobile Club of America. Aster motor with Prunel French running gear and a handsome body supplied by a New York carriage builder.

A. C. Bostwick's Clement French voiturette.

Roper's steam bicycle built in 1896 at Roxbury, Mass. Weight 150 pounds; highest speed attained, one-third mile in 31 seconds.

De Dion racing tricycle which won last Paris-Toulouse-Paris road race, covering

831 miles at a speed of 27 miles per hour. Highest speed attained, 49 miles per hour.

Steam bicycle built by W. W. Austin at Winthrop, Mass., in 1868. Said to have been run 2,000 miles. Weighs 90 pounds. Is an old wooden wheel bicycle of the front wheel velocipede pattern, to which a small boiler and cylinder driving the rear wheel has been added.

Winton Makes a Record

NEW YORK, Nov. 5.—Alexander Winton, with T. C. Collins as a companion, arrived at Madison Square Garden at 10 o'clock last night from Cleveland after a remarkable ride that broke all previous Cleveland-New York, and, in fact, all American long distance records. The run was made in three days, 20 hours. The actual riding time was 38½ hours. The distance from Cleveland to New York is 700 miles, but the chauffeurs went fully 100 miles out of their course through twice getting on the wrong course.

The owner of an American airplane has entered into an agreement with an American automobile transportation company in Tegucigalpa, Honduras, for the establishment of a regular commercial airplane service. The plane in use, to which a second will be added later, is a two seater with an eight cylinder, 180 h.p. engine.

Neatness and Cleanliness Play a Part in the Sale of Tires and Accessories

You, Like the Walters Auto Supply Co. Have Competition to Meet in the Butcher, Baker, Druggists' and Clothing Shops

If you are located in the residential district of your community, where there are nothing but homes for miles, and the street on which your place of business is located is as poorly lighted as most residential districts are, perhaps you will make wages from that business. It may even be your good fortune to make a comfortable living. But if you are located on a business street where the grocer, druggist, butcher, baker, clothier and merchants in other lines are located, and the street is well lighted and well traveled both by pedestrians and motorists, you have a better chance, of course.

Where Competition Begins

But on the street with other merchants, even if there is not another automobile dealer in fifty miles, you will have competition. The grocer, druggist, et al will furnish you a competition which you will find as keen as if a rival were across the street. This "competition" will be in the matter of attracting attention to your establishment and in keeping, at all times, your window and show room well lighted and clean, to say nothing of arranging displays in both that will catch the eye of the passer-by and make him stop.

There are many things which the small town accessory, tire and battery dealer can learn from the big city merchant



A crowded window, yes, but an attractive one. Other window displays which will be seen in the Walters shop will be to prove that a less crowded display is more effective. Herman, the manager of the store, will feature one or two things in a more dressier way in forthcoming displays

and there are just as many things which the big city merchant can learn from the small town man. Perhaps the greatest and biggest lesson which the small town dealer can learn from the city is that of neatness, cleanliness and "dressiness."

In the city, it is difficult to find a business section that does not have stores, noted for their window displays and, in many instances, those windows are in the stores of automotive dealers. This is where the "competition" comes in. In the case of the Walters Auto Supply Co., 6211 Cottage Grove avenue, Chicago, there is not only the competition of a progressive rival just a few doors away but there is a drug store, furniture store, clothier and cigar store, all in the same building, with which to compete.

On the Jump All the Time

All of these merchants are on the jump the whole time, bidding for the lead in attractiveness in their window displays and the Walters Company is holding its own. As you approach the building in which they are located from the north, there is a brightly lighted lobby (entrance to a dance hall) which dazzles in its color and gaiety. Then the drug store, the windows commanding attention just as the sharp word of an army officer does. Next is the furniture store, the clothier and then the Walters



The general neatness and cleanliness of this store are strikingly evident and suggest careful attention to the customer. Note the bins at the side for tools, the spools of wire and the cans of oil. Manufacturers display boards, Gilmer, Raybestos, Ajax and Kelly tires command attention

Auto Supply Co. A picture of their window is reproduced on these pages.

James Herman, manager of the store, is responsible for this window and has done well in his effort to rival his neighbors. Standing in front of the store in the evening will prove that. In less than five minutes, one night, twenty persons passed. Eighteen of these stopped and studied the window and out of that eighteen, nine entered and made purchases in the store. Does that mean anything to you? It will, when you are told that all of those people came from the direction of the other dealer, saw his window and passed on.

Personality Not Enough

Are you, too, one of the "other" dealers—one of the careless ones, depending wholly upon your personality and ability, to sell your merchandise? If you are, change those tactics, because people are passing you, too. The other dealer whom we refer to here is a good dealer. In his store on that same evening, people made purchases and he was sincere in everything he said. He was truthful and careful to advise buyers about their purchases and his ability to overcome resistance was remarkable in its quickness and earnestness.

But this is not enough. People don't know what you are until they get inside and talk to you and if they pass you up, because you have failed to put your personality into your show window, you deserve losing those sales.

Often, we have heard dealers say: "Oh, I don't bother much about my window—that's all right for a fellow who has a lot of room, but my place is too small."

Much Space Not Needed

The Walters company's window measures 16 ft. across and Herman has proved that a lot of room is not necessary. The store inside is 60 ft. deep, but, with as complete a stock as any dealer could want, is not crowded. In fact, the remarkable part of this is its orderliness. The cases display everything for sale. Bins contain tools and fitments for the car, racks display wrenches, gaskets. Spools, placed under the bins, call attention to different sizes of wire and cards placed neatly about feature some specialty or novelty.

The floor is clean, there is a freshness in the air that invites you to stay and look around and backed by all this is personality of the individual, the ability to sell that is just as certain to sell as is the rival dealer a few doors away.

In the rear of the store is a small stock room, never seen by the customers and yet as orderly and easy to reach as is the store. Service to the extent of



Just an ordinary sort of display case? But the display is not so ordinary. Note the arrangement of goods on the shelves, the bottom and second shelf, of course, get the most attention and, on top of the case, the manufacturers' displays, the Klaxon horn, runningboard lamps and stop light, the Alemite system of lubrication and the radiator ornaments. In the background, the orderly boxes where they are before the customer

changing tires is cared for in the rear.

In this window display Herman has, perhaps, got a good deal more represented than would seem advisable, but it is not thrown into the window and covered with dust. It is neat and orderly and each item is clear of everything else. In other window displays, to come, Her-

man intends to have variety. Special windows, featuring the tire sold and each accessory, will be arranged and there will be but one or two of the items against a suitable background.

This apparent "crowding" of things in this window was done simply to convince himself that a great number could be made as orderly as a few if the proper care were taken.

Simplicity Most Effective

However, the effectiveness of the window which features but one or two things cannot be denied and the people who pass the Walters store within the next year will find many interesting windows to attract and hold their attention.

An interesting item to note here is that for some time after opening the store, Herman found it difficult to bowl over the apparent wall of strangeness which kept people from the store. Some newspaper advertising was carried and a few letters were mailed but there were no appreciable returns. Then came a sudden change—people fairly flocked to the store and have been doing so since. The reason to assign for this change is nothing more or less than to say that word-of-mouth advertising, the word of satisfied customers to their friends, and the

power of the window display broke down this seeming barrier.

The satisfied customer, which is the first aim of the Walters store, had done his work in the unfailing manner which he always does and now Herman reaps the returns and goes on, adding continually to that long list of boosters.

DAN'Z DIARY

DECEMBER 8—"Holy smoke!" I sais to the boss the other day, "Seams like we are getting in quite a bunch of work for this time of year." Me being kind of disappointed cuz if work dropped of so me or Art would get canned they might be some hope of us starting a shop of our own.

"Yes he sais" I got to thinking about all the cars around town that should have some work done on them and come to the conclusion that if I was to go after some of that work I might get some of it to do this winter when we was in need of it and not only that but we wouldest have to turn any away next spring. It was a great idea I had and is working out fine."

The big peace of cheese! I suppose he thinks that was his idea to, after me

telling him a wile ago thay was plenty of work around if a guy was to go after it him talking at the time about letting me or Art go.

Well anyhow we aint got fired and maybe if we was to get bizzy we might get a raise me thinking they is about as much prospect of that as they is water running up hill. I sais to Art "Hey Art! what do you know about this old bird huseling around and getting in work i never thought it was in him"

"Well," sais Art, "That shows that if an old Hick like him can go out and pick up work for winter they aint no excuse for a young fellow loafing around," wich was the trooth me thinking gosh, i wish the boss would send me out to drum up trade so i could get a little experience.

Hard to Get Automotive Business in Winter? Think of the Ice Cream Man!

Our Task Should Be a Snap Compared With That of Keeping the Soda Fountain Bringing in Profit During the Cold Months

EVERY once in a while some one tells us that we are attempting the impossible when we advocate automotive business in winter.

You all have doubtless heard the story of a North Dakota man who took the dealership of a small car in the fall, sold a few and was just settling down for a period of rest when the manufacturer wired him that they were shipping him two carloads of automobiles.

This man was not well versed in the automobile business and he did not know you could not sell cars in winter. He thought the manufacturer wanted him to sell those cars, so he went out and sold them.

He was quite amazed when his feat called especial comment.



The cartoon that we reproduce from a recent issue of the Chicago Tribune tells an even more remarkable story. Every one of you can remember when the druggist took down his soda fountain in winter. Indeed, he often beat the "competent" housewife by getting his fountain put away before she got her screens out of the windows.

Such a thing as selling soda or ice cream in winter was beyond reason—no sane man would think of it!

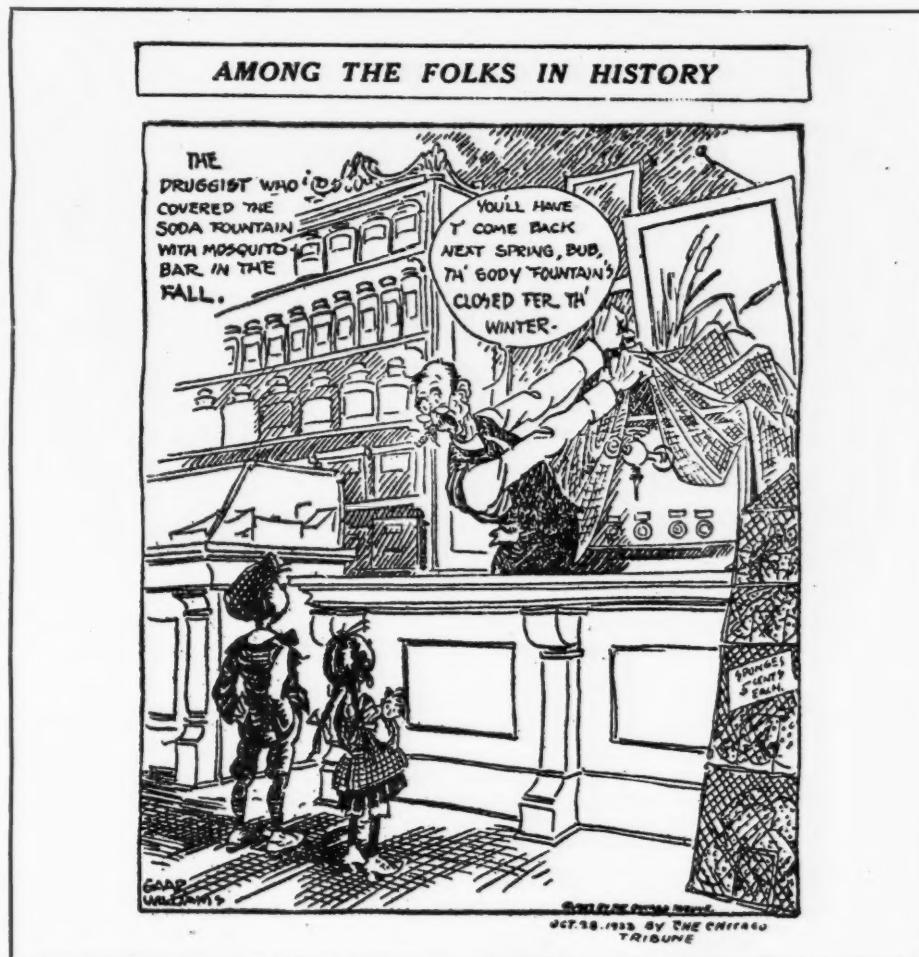
You remember that where the fountain was not taken down a red mosquito bar was hung over it and the counter that had been the temperance bar of the hot weather was covered with Christmas cards, or something of that kind.

It took the druggist a long while to realize just how much of a mistake he was making and the ice cream parlor man nearly ran away with his trade before he awakened. But he did awaken. First off he thought he had to have something hot and he put in a lot of bollions and such stuff that no one really wanted, but now he brazenly defies the snows outside and the frost on the windows and sells ice cream and wonders why he passed up this profit for so many years.

This changing of the seasons is so obviously profitable that the cartoonist is making a joke of the mistake of the soda fountain hibernation.



Last week's MOTOR AGE was the Winter Service Number, an annual issue of long standing. There was a time when "practical" automobile dealers were inclined to make fun of the point we were



trying to put over. Now these same dealers are for us and hope that we will awaken the entire trade to going after the winter business, for they realize that when a drive is put on, one community cannot succeed as well by itself as if

the neighboring communities are working along the same lines.

And so we commend to your thought the Winter Service Number of MOTOR AGE so that you may keep out of the joke book.

"Framing" vs. "Analyzing" a Job

Two terms often used in industrial management are "framing" a job and "analyzing" a job. Framing a job is constantly being confused with analyzing a job. This confusion often results in a serious misunderstanding among workers on the same job. The Business Research Bureau of the LaSalle Extension University offers the following explanation:

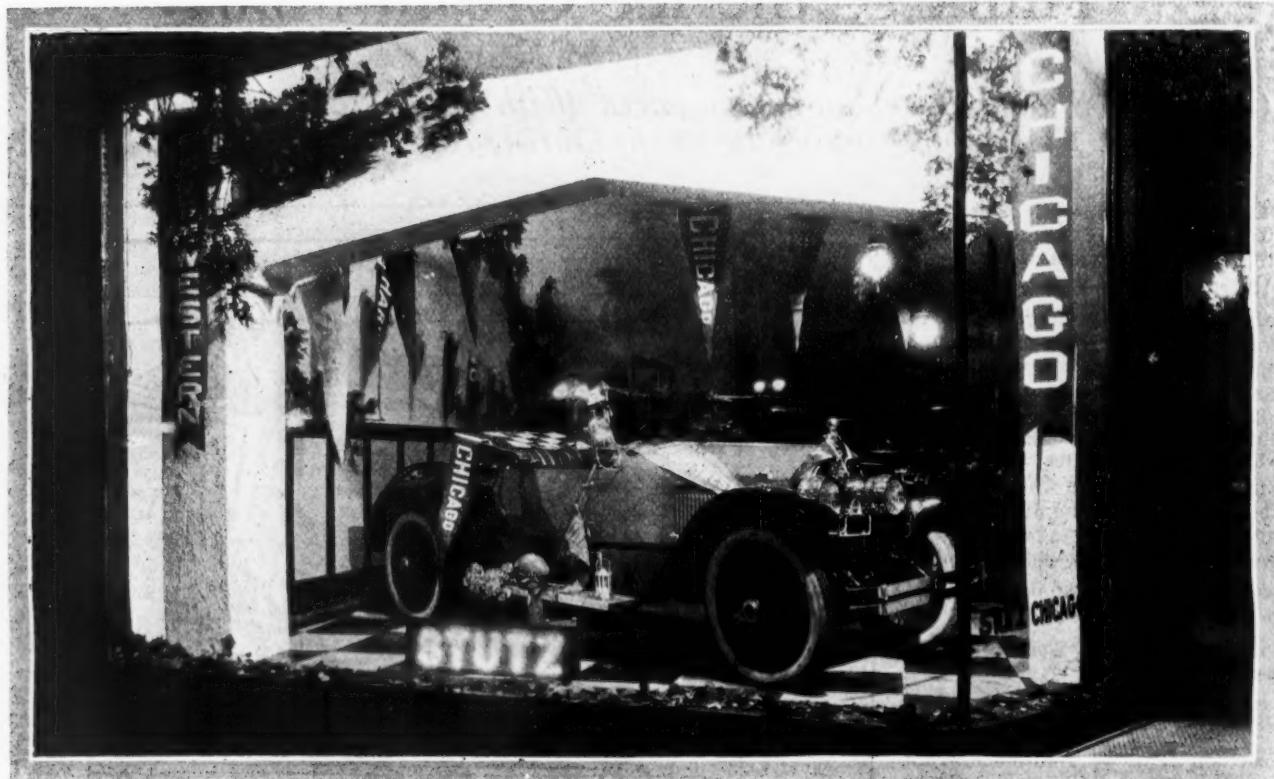
Framing means putting together a job by sketching out the plan or program of

it for a worker in order that he will know what changes are to be made by the various operations and tools. Framing is known in some industries as "making instruction cards."

Analyzing means the tearing apart of a specified job for the purpose of deciding what operations are necessary and arriving at definite information upon which to base investigations, experiments, instructions and schedules for gaining the maximum production.

Framing and analyzing, although directly opposite in meaning, are nevertheless closely related and necessary to each other.

MOTOR AGE'S PICTURE PAGES



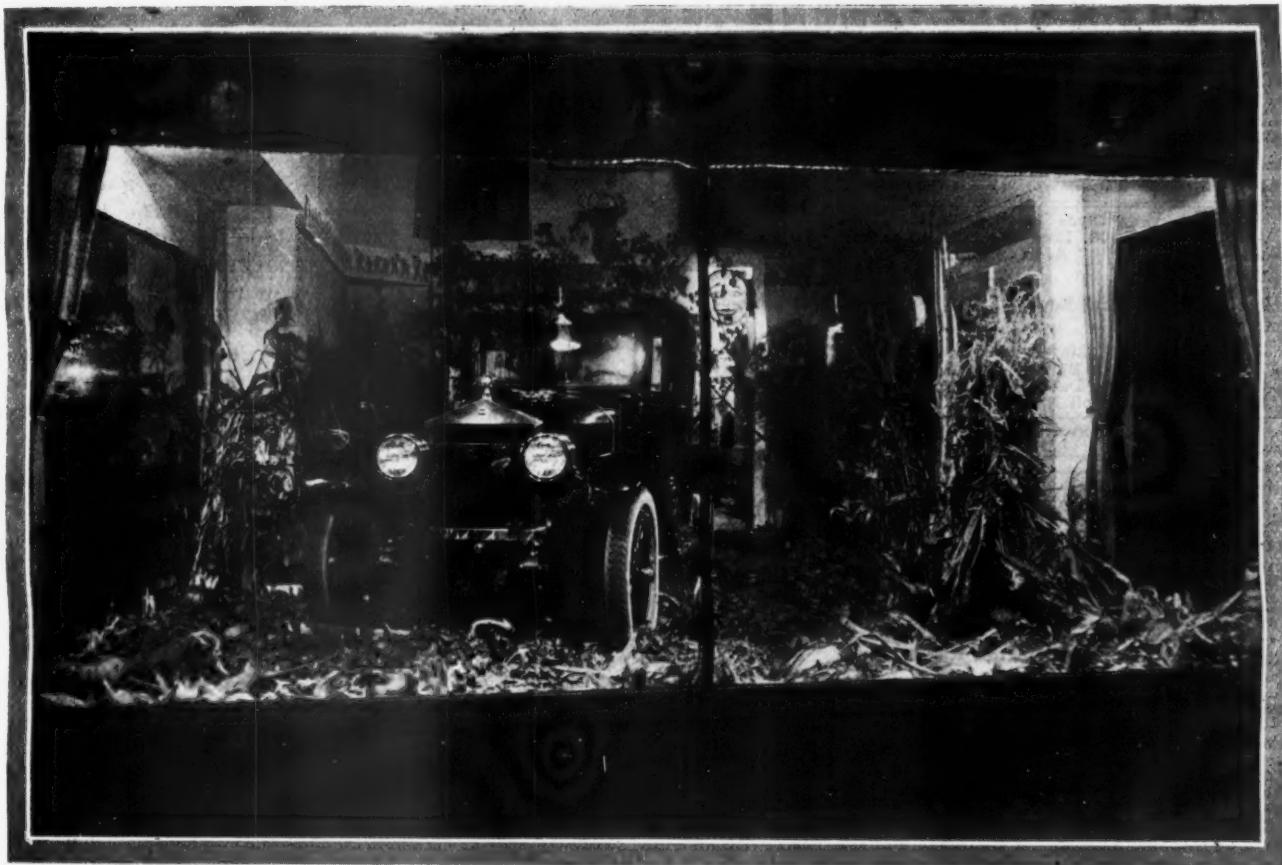
The Stutz Chicago company caught the spirit of the season with this display featuring football and its sport roadster. The archway is lined with autumn leaves and pennants of colleges. The idea was new and was well received on Michigan avenue

Harold L. Arnold, Hudson and Essex dealer in Los Angeles, recently cleared his entire main sales floor and donated it to the Dahlia Association of Los Angeles for one week for a dahlia show. A temporary sales room was provided in the rear. Arnold is a great believer in "institutional salesmanship"



Germany must be going through what we experienced some years ago only on a much larger scale. The Berlin show this year was full of what we called cycle cars and every other form of small conveyance. This one is made to appeal to horseback riders, it is said

OF AUTOMOTIVE INTEREST



A typical fall window is this shown above, featuring the Moon sedan. The corn stalks and leaves have turned the window into a picturesque farm scene



The automobile owned by C. H. Davis, president of the National Highways Association, which is decorated by license plates, of the same number from nearly every state in the union. It is Pres. Davis' ambition to have plates from every state in the country and its possessions



This is the Speed Wagon that established the remarkable record of 2270 miles without an engine stop

MOTOR AGE

Reg. U. S. Pat. Off.

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Harking Back

HOW quickly this great industry has come about is sometimes brought home to those who recall its beginnings. Last week A. L. Dyke of St. Louis was putting some of his records in order and he came across a clipping from The Motor World of Sept. 18, 1902. This clipping was a notice of a trip made from Centralia, Ill., to St. Louis by Dyke, Dr. C. L. Morey, then a dentist in Centralia, and N. T. Cunningham, a locomotive engineer of the same city. This incident was thought worthy of a two inch write up in The Motor World then, as now, a dealer publication.

Morey and Cunningham were among the early buyers of Dyke's No. 1 outfit, which consisted of the more intricate parts of the proposed automobile. They assembled these parts by doing a great amount of work themselves. Both Morey and Cunningham were mechanics of ability and they built a car that would make considerable speed and give very little trouble.

The editor of MOTOR AGE, then beginning a career as a newspaper writer, was the first person outside the builders of the machine to be invited to ride in it, and he recalls that pleasant and somewhat thrilling ride one hot summer evening. That car was the first in that section of the country and from that ride dates the interest of the editor of MOTOR AGE in automobiles, an interest that has not flagged.

Cunningham some time ago retired as a locomotive engineer and to avoid idleness established himself in a taxicab business and drove one of the cabs.

Have you planned that Xmas window?



Tires

NEXT week the annual meeting of the National Tire Dealers' Association will be held in New York. The previous meetings of this association have not been of major importance, because the N. T. D. A. did not demonstrate in these meetings that the association represented a large element of the tire distribution machinery. We are hopeful, and we believe that the meeting soon to be held will demonstrate a sufficiently representative interest to make this association a force in tire affairs.

This is the time to act in the tire business. The industry is just now in the most hopeful position it has ever been, although the actual business situation may be bad, some say very bad. But the psychology of an industry is more important than the actual profits of the week or the month. We firmly believe that the most dangerous period for the tire industry was in early 1920 when this industry thought that it was sitting on top of the world and that the factory was the absolute czar of all tire dealers and likely to become the autocrat of all business.

By some strange method of reasoning, the tire people became boastful and arrogant. The masters of the industry appeared to forget that their product was only an accessory and that their market was circumscribed absolutely by the number of motor vehicles in use and the average mileage of these vehicles.

There was absolutely no sale for tires until some better salesman had sold a motor vehicle and the owner of this vehicle had sufficient funds to keep his car in order and buy gasoline. There was no free market for tires, and yet the tire companies plunged ahead into dizzy finance as though they thought that the country and even the world had no thought except to buy tires and then more tires.

Then came the drab days when people did not buy motor vehicles and did not buy much gasoline and the real tire manufacturers and the hundreds of imitation tire makers and the hundreds of stock company promoters saw the collapse of their houses of paper.

But even this lesson was wasted on some real tire makers. They were so dizzy from their fall that they could not see that, after all, any manufacturer is absolutely at the mercy of his selling organization and that with only cowed servants in the field, the tire manufacturers could not sell as they should sell. Gradually this thought has been sinking in.

Within the last few weeks two very important announcements have been made by the tire manufacturers. These are:

Restrictions on spring dating sales.
 Abolishing of consumer price lists.

Several manufacturers are going to act on these recommendations. We believe that both of these moves are good ones and that they will result in good. The big thing that we see in them, however, is that the tire industry is reading the handwriting on the wall; that it is listening to the good dealers of the country and that they will be ready to catch step with those things which will make for a prosperous and more or less contented dealer organization.

The tire business is a big business and it should be a clean, happy business, and we believe that a beginning has been made toward this end. Because of the things that have happened within the last few weeks, we wish the tire makers and their dealers a happy journey back to the land of good business and sound profits.



It is the all-year-around shop that pays profits.



Of Factory Interest

THE other day a man who formerly made a good bit of money in the automobile business came into the MOTOR AGE office to discuss taking on a dealership in a city of 40,000. Why this man went out of the automobile business and why he wants to return, is not a part of this story. But he is coming back with more money at his command than he formerly had.

And so we took the specification sheets that appear in MOTOR AGE each week and began a discussion of the lines represented in that city, as to the strength of the dealership there and the likelihood of a change. It happens that this city has a very large representation of lines for it is in good selling territory.

Finally we came to one line that is in a highly competitive class which is always mentioned when good cars and good organizations are mentioned. This line, he said, was open in that city.

"That would seem to end the discussion," was the remark passed to him.

"Not in this case," he said. "That line has been sold by the same firm that represented a competing line in many respects. This firm believed in the other line and gave fair service on it and when they sold out, the other line was an asset to them. They got some money for the good will. But they have serviced this line of cars so badly, pretended to give so much away in the line of service, that the entire community thinks of it as a weak line. I do not want to undertake to overcome this bad impression. I would rather take what may nationally be considered a weak line and build it up there. This line has been on the market several weeks and I understand no one wants it."

The thought we would leave with the dealer is this: If you want your line to be an asset when you get ready to quit, you must supply service and maintenance. The thought for the factory is that this laxness in seeing that proper maintenance was maintained in this city has put the line in an entirely wrong position in this community and that the cost of turnover of dealers is going to be very heavy.



Now is the time to push those winter accessories.



Drifting Backward

A CONSIDERABLE effort is being made to put maintenance departments on a business basis. For years service has meant to the car owner something for nothing, or free repair work.

In servicing the electrical units on the motor car the same problem has been one for which a solution has been difficult to find. Only recently has there been a

movement in the direction of freeing the battery service station from the burden of supplying free water service to car owners in the vicinity of the service station and to those who care to stop at the front door.

In face of the movement to get a legitimate return for a service rendered comes a surprise in the house organ of one of the big battery companies, and we believe the idea they have approved got into their paper without being duly considered. The campaign to which they refer and which they claim paid big dividends features the following advertisement:

"Use of a
Rental Battery
Free
With a Recharge
Only \$1.00
No charging time limit
No danger of ruining your battery by
Overheating
The Blank battery
Factory service station"

The above advertisement was featured on a card designed to be attached to the steering wheel or other portion of the car where the owner could not fail to see it.

There is not a doubt in our minds as to the effect. Those car owners who are looking for something for nothing will take advantage of the fact that they can get the battery charged for a dollar and at the same time get a rental battery for nothing. It will, of course, bring a certain amount of business to the station for a time, but what is the nature of this business? Will it not bring to this station all of those car owners who have batteries of questionable character only too glad to get a rental battery to use for a while? At the same time it will undo a lot of the work that has been done in trying to get car owners to pay a legitimate charge for a service rendered.

The features of the campaign mentioned are as follows:

- 1—Free use of rental battery while customer's battery is being recharged.
- 2—Recharge \$1.00, all sizes, all makes.
- 3—Batteries charged slowly, no rushing, no time limit.
- 4—Batteries charged carefully, no danger of overheating the battery.

We wonder if they carefully considered the cost of their rental batteries, the interest on the investment, the cost of keeping them up and the difficulties into which their campaign might lead them. Looking at items 3 and 4 of their campaign it appears that it is also directed against the more progressive stations who have installed constant potential charging outfits.

What would happen if all battery service stations would do the same thing? There would then be no advantage to this particular service station. Figures compiled by "The Radiator" show that in the average service station it costs more than 80 cents to charge a battery, this being the total cost to the battery station, when the value of floor space, labor, paint, acid, current, advertising, depreciation of equipment, interest on investment, clerical work and similar items are considered. If this is true, how much money is such a station really making when they have a margin of approximately 20 cents and supply rental batteries for nothing?

One of the chief causes of dealer mortality is doing business without knowing the cost of doing it, and to our way of thinking a campaign of this kind is the beginning of a flirtation with the sheriff.

Bankers Pay Tribute to Dealers

Investors Judge Factories By Distribution Systems

Declare Good Showing of Current Assets May Be Discounted by Used Cars Carried at High Values

WASHINGTON, Nov. 3.—Discussing automobile financing in its annual report to the Investment Bankers Association of America the committee on public securities recommended that bankers exercise caution in investments in the industry. The general conclusion of the committee approved by the Board of Governors and subsequently the convention itself was to the effect "that much mortgageable property can be found in this industry to form the basis for good bonds; but that securities, based on current assets and earning power, should be very carefully studied by the banker before becoming responsible for them to the investor." Investment bankers feel that the dealers' market should be closely studied at all times.

The report on industrial financing was signed by J. W. Horner, Jr., of Dillon, Read & Co., New York, as chairman, and Arthur H. Gilbert, vice-chairman. The text was written by Gilbert at the request of the committee. The chapter devoted to automobile financing stresses the effect of used cars on financing the industry because of their influence on the market. The claim as to the earning power of the industry was disputed by the bankers committee, which declared:

"As a whole, it may be said that the automobile industry has not proved especially profitable. It is true that the success of the largest manufacturer gives perhaps as large a total of prosperity as the average of other industries, but there are comparatively few other notable successes. This is partly the result of trading old cars as has been described, but it seems also to be partly due to the inability of any one company to maintain a uniform excellence of product. Even the best makes have their off years. The progress of the industry calls for constant changes. The maker who keeps a favorite model unaltered for two or three years finds customers changing to other makes; but if he changes his model, it may be two or three years again before he gets the new car perfected—and in the meantime he may lose much of his good will. On the whole, this seems to be unavoidable. It is a waste arising from rapid growth of the industry, for which practically all must take their turn in paying. Another factor affecting earnings is the expense of sales. The larger companies set the pace in costly show rooms, extensive advertising, and a general atmosphere of luxury and good living surrounding their salesmen. These companies do not always make money by

these methods. But companies that would prefer not to follow them often find that unless they do, their products remain comparatively unknown. Here again, the individual company may be the sufferer from the general character of the industry.

"It may be necessary to discount a good showing of current assets and earning power, until a thorough study of the company's methods of distribution shows that there are no weak spots in the way of used cars on hand, carried at a high value, or obligations on hand of dealers (or advances to them) who are loaded with cars, or in poor shape financially. Also, the general position of the dealers' market should be considered in connection with the rate of output, and the cars that must be disposed of in the next few months. This is only the application of ordinary industrial financial principles to this industry, but it is the more necessary on account of the dependence of the automobile business on a trading market, rather than a cash market."

APPERSON CREDITORS WILL WAIT

KOKOMO, Ind., Nov. 5.—Creditors of the Apperson Bros. Automobile Co., at a meeting here Thursday, indicated a willingness to withhold pressing their claims pending the outcome of steps being taken to refinance the company. In spite of this action, however, the Indianapolis Pump & Tube Co. on Saturday filed suit on a claim for \$200 said to be due it from the Apperson company.

At Thursday's meeting President Don McCord said he had an agreement with bankers that they would advance further credit provided the creditors would withhold pressure on their claims. The proposed refinancing plan provided for the payment in cash of all claims of less than \$200 in the event the extension of credit was granted. A majority of the creditors at Thursday's meeting agreed to accept notes payable in August, 1924, and May and September, 1925.

MOSKOVICS LEAVES MARMON

INDIANAPOLIS, Nov. 4.—Fred E. Moskovics, who has been vice-president of Nordyke and Marmon Co. for five years and an executive of the concern for ten years, announced his resignation yesterday in order that he may devote his entire time to personal affairs. He will retain his substantial interests as a stockholder in the Nordyke and Marmon company.

Walter Marmon, president of Nordyke and Marmon, in expressing his regret over Moskovics' resignation, said, "The move of Mr. Moskovics was necessitated by the pressure of his personal affairs. The necessity which compels the severance of a very pleasant relationship is regretted by both of us."

Moskovics entered the concern as Commercial Manager 10 years ago.

N. A. C. C. Votes to Renew Cross-Licensing Agreement

Only One Suit in 10 Years by Member of Pact; Clifton Is Originator

NEW YORK, Nov. 5.—Members of the National Automobile Chamber of Commerce have voted to renew the cross-licensing agreement that has been in force since 1915 and which was due to expire in January, 1925. Satisfied with the successful working of this pact, they have not waited for the expiration but have voted an extension for another term of years.

The original agreement covered a term of 10 years, starting with 1915 and there are 126 companies owning patents in the pact. In all some 600 patents are in the pool and since the agreement has been in force there has not been one patent suit among members of the Chamber. Only one company ever withdrew, the Locomobile, and after that concern was reorganized prior to its purchase by W. C. Durant, it again subscribed to the agreement.

Credit for originating the cross-licensing idea and whipping it into shape is given to Col. Charles Clifton, C. C. Hanch and Howard E. Coffin. When they presented it to the members of the Chamber all could see its value and it was adopted without hesitation. The manufacturers declared that their mission was to manufacture and sell cars and not to engage in litigation over patents and they give cross-licensing of patents and standardization of parts by the S. A. E. the credit for the low price and quality of the average American automobile.

SUES MIDWEST ENGINE CORP.

INDIANAPOLIS, Nov. 3.—The Butler Manufacturing Co. of this city, maker of pistons and rings, filed suit for receivership against the Midwest Engine Corporation here yesterday claiming insolvency and inability to pay an \$870 debt said to be due the plaintiff. Representatives of Midwest deny that there is any danger of insolvency facing the new concern which took over the assets of the old Midwest Engine Company some time ago. The major operation of the concern at present is the repair of railroad freight cars. Passenger car and truck engines have also been made but at present this part of the industry is said not to be operating.

E. C. O'DONNELL WITH BIFLEX

WAUKEGAN, Ill., Nov. 2.—"Eddie" C. O'Donnell, formerly with the merchandising department of the Automotive Equipment Association, has joined the Biflex Corporation, manufacturer of Biflex bumpers and other automotive products, as assistant to Willard E. Ericson, the sales manager.

Hearing Postponed in Suit Against Haynes for Receiver

Reorganization Plans Under Way, Directors Say—Merger With Winton and Dorris Dropped

INDIANAPOLIS, Nov. 3.—Suit was filed this week in Kokomo against the Haynes Automobile Co. by the Oakes Co. of Indianapolis, asking judgment and the appointment of a receiver for the Haynes company. The complaint alleges that the Haynes company is unable to pay outstanding indebtedness and that its liabilities are approximately \$2,750,000.

Officials of the Haynes company said that the claim of the Oakes Co. had been considered at a directors' meeting Monday and Tuesday and that decision was made to withhold payment of all claims until plans for refinancing of the Haynes company have been consummated. Directors of the company admit that the proposed merger of the Haynes, Dorris and Winton has been dropped, but add that other plans are now being made to refinance the concern. Attorneys for the company said that the petition for receivership would be vigorously resisted. Production has been suspended for three weeks.

Officials of the Haynes company state that they have retired about \$2,000,000 of indebtedness in the last year. They estimate assets of the concern to be double the liabilities. Rumors have been current in Indiana prior to the Oakes action that Elwood Haynes, president of the concern, would take a more active part in the management than in recent years.

Haynes directors, in a letter to creditors, say arrangement for \$1,000,000 additional capital has been made, provided creditors accept 10 per cent cash, an equal percentage next June, with balance in notes due January, 1925, the company to retain the right to make monthly payments following June if desired. A complete reorganization of management is contemplated, the directors say.

Motion for continuance of the hearing against the Haynes company, made in court here today, was granted by the court and the Monday, Nov. 5, date originally set for the hearing has been moved forward to a date not yet announced.

New Star Models Are Priced With Chevrolet and Overland

NEW YORK, Nov. 5.—Durant Motors Inc., has removed the Star from the Ford class and put it into a division where it will be in competition with the Chevrolet and Overland models. This change has been brought about through the debut of the new Star model which is accompanied by a price change which jumps the touring car to \$490.

Some marked improvements in construction of both chassis and open bodies have been made by the introduction of specially painted bodies, together with

nickel plated radiator shell, headlamps, etc., usually associated with the so-called sport models. The special jobs sell at a higher price than the standard line, which is painted black and fitted with 30x3½ inch fabric clincher tires, while the special jobs have 31x4 inch straightside cords.

The brake layout has been revised, two short brake shafts now being fitted, one at each side of the frame just forward of the rear spring front end. This is said to overcome the difficulty formerly encountered with the ribbon steel band breaking. The Adams axle is continued without change.

The new and old prices on the various models follow:

	STANDARD	New	Old
Roadster	\$490	\$414
Touring Car	490	443
Coupe	640	580
Sedan	785	645

SPORT MODELS

Touring Car	\$640
Sedan	935

Detailed description of the new Star models will be published in MOTOR AGE as soon as available.

1,000,000 HORNS THIS YEAR

NEWARK, N. J., Nov. 3.—The Klaxon Company a few days ago completed the 1,000,000th automobile horn manufactured by the company this year, making a total of more than 4,000,000 horns which the company has produced. A ceremony was held at which the 1,000,000th horn produced this year was presented to William M. Sweet, president of the company, by Fred W. Ayers, vice president.

LANSING TO HAVE APPLEBY MART

DETROIT, Nov. 3.—Lansing will operate the first Appleby plan motomart in this state. The dealers of that city signed for the mart at a meeting Friday and elected officers to take care of the further organization details. The mart will be established in a building already selected with a formal opening on Nov. 19, and a manager selected by Percy Chamberlain Associates, Inc., will be installed.

RADOYE RESIGNS AT HAYNES

KOKOMO, Ind., Nov. 5.—Gilbert U. Radoye, director of sales and advertising of the Haynes Automobile Co., announces his resignation. Radoye has been with the Haynes organization for five years. He has not yet announced his plans for the future, and his successor has not yet been named by the Haynes company. Prior to his connection with the Haynes Company, Radoye was with the Marmon and Packard organizations.

ACCESSORY SHOW AT CHICAGO

CHICAGO, Nov. 5.—An open show for automobile accessory manufacturers will be held at the First Infantry Armory here Nov. 12 to 17, it was announced today by Robert M. Jones, manager. The automotive jobbing trade and the public generally will be admitted to the show. The dates are the same as those of the Automotive Equipment Association's annual show at the Coliseum.

Ford Dealer Gives Business to Employes for Four Months

Glenn E. Holmes Experiments With Plan in Chicago and Milwaukee Stores

CHICAGO, Nov. 5.—Glenn E. Holmes, Chicago and Milwaukee Ford dealer, has given up his business—temporarily, or, to be exact, for a period of four months. He has turned the reins of the business over to his employes and a committee of workers are now in charge in both the Chicago and Wisconsin establishments.

"It is an experiment of Mr. Holmes", explained one of the salesmen, "we employes have usually split a good big bonus among us each Christmas and this year, we will split the entire proceeds of the business. Of course it is up to everyone to work as hard as he can and bring that figure up."

"It certainly is an incentive to the boys in the shop," the service manager said, "they are working like ants and after the business is returned to Mr. Holmes next February, he will find that some real work has been done for the future. It will help, immeasurably, to make the men realize just what it means to do good work and plenty of it. And, once in the habit—."

Holmes gave his workers a dinner on the night he turned the business over to them and the next morning prepared to leave for Milwaukee to make similar arrangements. It is estimated that the employes will be able to divide from \$15,000 to \$20,000 among them instead of the usual \$8,000 to \$10,000 bonus. Holmes explained that he intended the experiment to point out to him the "dead" ones in the organization and to permanently pep up all. Every one, from the janitor up, will share.

ORDERED TO FILE CLAIMS

INDIANAPOLIS, Nov. 5.—Creditors of Weidely Motors Co. are directed by an order of Judge Harry O. Chamberlin of the Circuit Court in Indianapolis to file their claims on or before Dec. 3. Any creditor failing to file claims by that time will be barred from sharing in the assets of the receivership. The receiver, William H. Fletcher, was appointed following a suit filed against the company by William A. Umphrey July 27.

KALAMAZOO TRADE MEETING

KALAMAZOO, Mich., Nov. 5.—At the next monthly meeting of the Kalamazoo Automobile Trade Association Nov. 13 the speakers will be Roy Peed of Willys-Overland, Inc., and Mr. McMullen of the Oldsmobile engineering department.

TRUCKS FOR JAPAN

PONTIAC, Nov. 3.—Fifty 5-ton trucks were shipped by the General Motors Truck Co. this week to Tokio, Japan. They will be used in hauling away debris and doing general construction, following the recent earthquake.

Detroit Dealers Sell 4,692 Cars; 581 Trucks in October

Last October, 2,989 Cars and 356 Trucks Were Delivered to Owners

DETROIT, Nov. 3.—Detroit dealers sold and delivered 4,692 cars during October as compared with 2,989 in October last year, and sold 581 trucks, both light and heavy duty, as compared with 356 in the same month of last year. By far the largest percentage of gain in car deliveries was in closed models, indicating not only or so much that business is at least one-third better than last year, but that dealers are getting closed car deliveries this year, where they could not get them in 1922.

November sales are expected to run at least 25 per cent better than last year, on the basis of the general business of the year to date. In November, 1922, car deliveries in Detroit were 2,099 of which 1,254 were closed models. This would indicate a business of at least 2,500 cars in November, and if the same rate of gain as in October continues, the total will approximate 3,000.

The one severe restraining influence to good November selling is the used car situation, which is admittedly much worse than last year. To do the possible business in November dealers will have to take in a lot of used cars and they are now close to their limits on used car stocks. Unless a good volume of used car buying can be induced it is likely dealers will refuse to accept further trades. There are several dealers now who are practically unable to do business because of used car stocks.

Stocks of new cars in dealers' hands are limited to open models and only an ordinary quantity of these. There are no closed models in stock and dealers in the standard lines are able to sell as many closed cars as their used car condition will permit.

Dallas Fall Show Is Big Success, in Every Respect

DALLAS, Tex., Nov. 3.—The fall automobile show of the Dallas Automotive Trades Association which has just closed is characterized by automobile dealers and automobile owners as the greatest success in the nature of an automobile show ever staged here. The show was a success in the matter of interest stimulated, cars sold and number of persons attending.

The show was held in the Fair Grounds during the State Fair of Texas. The show was of 16 days duration. During those 16 days more than 1,000,000 persons visited the fair grounds. It is estimated at least half of these attended the automobile show. Just how many new models were sold at the show has not been announced. A rough estimate placed the number at around 2,500. A statement was made by a dozen automobile dealers that the moderate priced closed car appeared to be the favorite in

all sections and with all classes.

Exhibitors found colored bodies were preferred to old blacks, even by mere man. About every second car sold was one with a rather vivid colored body. Disc wheels were also given preference. The Dallas dealers are of the opinion closed cars with colored bodies and disc wheels will be the main sellers this year. They will play strong on those lines.

Annual Meet of Motor Truck Industries, Nov. 21, Detroit

DETROIT, Nov. 3.—The annual meeting of Motor Truck Industries, Inc., will be held Nov. 21 at the Detroit Athletic Club. One half of the day will be given over to the regular order of business, election of Directors and in turn the election of officers, following which there will be addresses by four speakers. In addition to the members of the association, the meeting will be attended by a number of other parts and truck manufacturers who will be invited.

The subjects to be assigned to speakers will include methods of territorial analysis by the factory, so that prospective dealers may be given a definite idea of the sales possibilities of districts, and may enlist banker support on definite propositions; motor buses, designs and trends to aid in the development of bus transportation, export market possibilities for truck manufacturers and their development. The fourth subject is under consideration.

SUES FOR RECEIVER FOR NATIONAL

INDIANAPOLIS, Nov. 3—Suit was filed here against the National Motors Corp. by the Polson Mfg. Co., windshield makers, asking for the appointment of a receiver for the concern, successor to the old National Motor Car and Vehicle Corp.

The complaint based on four notes said to have been given by the old National concern last January and payable on July, Aug., Sept. and Oct. 12, alleges that after execution of the notes the old National concern transferred all its assets to the merger which has not been able to raise money to carry on the various plants of the new organization, and that the plants have been losing money. Judgment for \$900 is asked for.

WESTCOTT INCREASES OUTPUT

SPRINGFIELD, O., Nov. 3.—Production is being increased at the plant of The Westcott Motor Car Co. Driveaways during the last week were made from the plant to Chicago, Cleveland, Utica, N. Y., and Indianapolis. About 60 per cent of the cars sold now are of the closed type.

TWO FORD RECORDS

DETROIT, Nov. 3—Ford Motor Co. production for the week ending Oct. 30 established two new records, the cars and trucks for domestic plants reaching 42,271, an increase of 502 over the week of Sept. 25, and Lincoln output reaching 223, the highest to date. Tractor production at River Rouge was 1,836.

A. M. A. Entertains Jobbers and Their Salesmen at Dinner

Mogge of A. E. A. Shows Films and Gives Address to Large Attendance

CHICAGO, Nov. 3.—A large number of jobbers and their salesmen from Chicago and Milwaukee were entertained at dinner last night by the Automotive Manufacturers' Association, and after the dinner Arthur R. Mogge, merchandising director of the Automotive Equipment Association, made an address.

Mogge explained the progress of the A. E. A.'s Christmas sales campaign and showed the two motion pictures, "An Automotive Christmas," and "Ask 'Em to Buy." Mogge stated that thus far more than 100 automotive manufacturers have arranged to pack their merchandise in Christmas packages or wrap it in holly paper. Some manufacturers, he said, are spending as much as \$25,000 in the promotion of special sales campaigns. One, he added, has arranged to send out 85,000 complete window trims for the holidays.

The Christmas campaign, Mogge said, has now reached the stage when it is largely up to the dealer. Jobbers have been pretty well stocked with holiday merchandise and they should cooperate with the dealer, he said, in getting the public to buy it. He said that through the cooperation of jobbers practically every automotive dealer in Philadelphia had agreed to display, beginning Nov. 1, a large streamer in his windows reading, "Give Something for the Car for Christmas."

This was one of the largest meetings the Automotive Manufacturers' Association has held. Noah Van Cleef, president, presided.

I. H. C. in Production on New 6000 Pound Model Truck

CHICAGO, Nov. 1.—The International Harvester Co. is in production at its Fort Wayne works on a new motor truck of 6000 pounds capacity known as Model 63. This truck is powered with a new four-cylinder engine, the crankshaft of which is carried on two ball bearings. Both the crankshaft and the ball bearings are guaranteed for the life of the truck.

The chassis is made in two wheelbase lengths, 140 inches, priced at \$2750, and 165 inches priced at \$2835. The appearance of the hood is a radical departure from the previous design of International trucks, due to the fact that the radiator is mounted in front of the engine instead of behind it.

The engine in this truck has been designed with a view to the greatest possible accessibility to all working parts. Regular equipment includes electric head and tail lights, battery, generator, horn and tools.

Future production will include other sizes and types constructed along the same general lines of this model.

Closed Car Is Mainstay of the Industry, Says Reeves

N. A. C. C. Official, After Tour of Country, Says Demand Will Be Better

NEW YORK, Nov. 3.—After visiting the chief automobile centers in Ohio, Indiana, Illinois and Wisconsin, talking with many dealers and manufacturers, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, has returned to his desk, satisfied with the condition of things in general and believing that the closed car is the hope of the fall markets.

"Closed car demand is the mainstay of the industry at the present time," declared Reeves, "and the first cold spell ought to materially strengthen the market. The past six weeks have been slow, but then we always expect considerable slowing up in this period of the year. Several factors have tended to retard business, particularly this fall. The warm weather has led to the continued use of open vehicles and has delayed fall purchases of closed jobs, so I am looking for Jack Frost to help things along."

"Furthermore, with the heavy buying which maintained throughout the first eight months of the year, it is probable that the major share of the immediate market, especially for open models, has been accommodated."

Continuing Reeves said:

"The general feeling among the dealers is that the controversy over four-wheel brakes has slowed down business considerably from what it would have been otherwise. Among dealers and individuals there is a decided difference of opinion concerning this mechanical change. Dealers declare that for the first time in 20 years the industry is engaged in a controversy which involves the question of the safety of equipment to be put on cars and that the public has consequently been hesitant about buying."

"Most of the dealers, however, are in a stronger position than a year ago. They sold a large volume of cars and trucks during the first eight months of the year and, profiting by their experience of previous years, did not, for the most part, make reckless trades in used cars."

"Meanwhile the motor truck outlook is considerably better than it has been in two years. There is a demand for both light and heavy vehicles. The bus market is increasing with the predominant demand for special bus chassis."

"The tone of business in general in the midwest may be said to be that of conservative optimism. There is confidence in the fundamental soundness of the industry, coupled with a disposition to proceed slowly and the desire to carry only a limited amount of stock on the shelves, or in the warehouse."

"The motor trade, while not certain that the unusual business of 1923 will be repeated in 1924, believes that the demand will nevertheless compare favorably with most of the preceding years in the business."

RECEIVER FOR REORGANIZATION

CLEVELAND, Nov. 3.—Thomas P. Goodbody, vice-president and comptroller of the Hydraulic Pressed Steel Co., one of the largest manufacturing establishments in this city, and engaged largely in the manufacture of automobile frames, has been appointed receiver of the company, by Federal Judge D. C. Westenhaver. The suit for the receiver was brought by one of the company's creditors, the Savage Arms Co. It is a friendly proceeding and the appointment of the receiver is a preliminary step to a reorganization, which will strengthen the position of the company, it is claimed.

500 Hear Program Arranged by Louisville (Ky.) Dealers

LOUISVILLE, Nov. 3.—The future of the automobile industry, its history and a lesson in automobile salesmanship were outlined to approximately 500 automobile dealers, salesmen and representatives of other phases of the business at a banquet Tuesday night at the Brown Hotel under auspices of the Louisville Automobile Dealers' Association.

Robert E. Lee, St. Louis, president of the National Association of Automobile Show Managers, reviewed the history of the automobile business. Don C. Prentiss, a sales promotion expert of Detroit, discussed salesmanship. Mayor Huston Quin, in a short address, welcomed the visiting dealers to Louisville.

Others at the speakers' table representing the various phases and branches of the motor industry in Louisville and Kentucky were:

W. A. Thomas, toastmaster; Prince Wells, president; William O. Protsman, vice-president, and George T. Holmes, secretary, Louisville Automobile Dealers' Association; J. E. Kittrell, Lexington, president Kentucky Automotive Trade Association; Jas. T. Short, representing the truck dealers; W. R. Hunter, president Louisville Battery Dealers' Association; and R. A. Wathen, representing the accessory jobbers.

COURT REJECTS DANIELS BID

PHILADELPHIA, Nov. 3.—An offer of \$8,271 for the entire assets of the Daniels Motor Co. of Reading, Pa., made at the public auction the other day, has been rejected by Judge Dickinson. The court told the receivers they could apply for a resale after they had considered a proposal for holding the sale in abeyance for two weeks and an offer of \$110,000 for the assets, made by a syndicate.

NOMINATIONS AT BALTIMORE

BALTIMORE, Md., Nov. 3.—The Committee on Nominations of the Baltimore Automobile Trade Association has made the following nominations: A. H. Bishop, for president; Max von Schlegell, for vice-president; E. T. Backus, for secretary-treasurer, and E. R. Myers, for member of the board. The election will be held on the third Tuesday in November.

Hupmobile Passes Fifteenth Milestone in High Gear

More Than 200,000 Cars Sold Since 1908, When Company Was Organized

DETROIT, Nov. 3.—Hupp Motor Car Corp. will celebrate its fifteenth anniversary in November. In that time the company has sold more than 200,000 Hupmobiles and more than three-fourths of these are reported in service. Hupmobiles are in operation in every part of the civilized world, according to factory statistics.

"Hupp was organized in November, 1908. It began at once to build automobiles of high quality and durability and that policy has been rigidly followed," said President C. D. Hastings. "The concentration by our executive, engineering, manufacturing and sales departments on one type of car has resulted in a quality and a genuine economy in manufacture impossible otherwise," he said.

Though organized 15 years ago, it was not until 1909 that any completed cars were built. Factory records show first shipments in February that year when two were sent out. By the year's end 1,618 cars had been built and sold. In 1910, 5,340 cars were made. In 1920, development of the manufacture of the car had reached such a point that the company determined to stage its famous trip around the world. This trip occupied more than a year and visited among others, 23 countries in which up to that time an automobile had never been seen. About 40,000 miles were covered.

In the 15 years Hupp has built six different series of cars, including the recently announced R-12. Each car has represented, the factory states, a forward step in manufacture and design which has been the subject of wide comment. With its extensive manufacturing facilities, the company declares it enjoys as great a control over the units and material entering into its completed cars, as any other company in the medium priced field.

Vincent Bendix Gets Rights to Perrot Brakes for America

CHICAGO, Nov. 5.—Vincent Bendix, well known as the inventor of the Bendix electric starter drive, has just returned from France with American rights to the Perrot four-wheel brake system.

Perrot brakes are used on more than 70 different makes of French, English and other European automobiles and in this country on Cadillac, Buick and Oakland cars.

Bendix is forming an organization to take care of the manufacture of controlling parts and sale of the Perrot four-wheel brake system in this country. An office has been opened in Chicago at quarters of Bendix Engineering Works where preliminary work is being handled.

Tire Manufacturers Say That Consumers' List Is Out

Members Attending Divisional Meeting of R. A. A. Believe That Industry Will Abandon Plan

CHICAGO, Nov. 2.—It was the opinion of tire manufacturers attending the Tire Manufacturers' Divisional Meeting of the Rubber Association of America here yesterday that the consumers' price list is a thing of the past in the industry. This was one of the important subjects discussed at the divisional meeting and it was evident that the action of Firestone, Fisk and United States Rubber Co. in abolishing advertised retail price lists was welcomed by the manufacturers and would be followed by practically the entire industry.

The abandonment of the consumers' list necessitates a change in the method of figuring adjustments and the Service Managers' Committee recommended that a uniform practice in this respect was desirable. The committee's suggestion was that:

"Adjustments be based on a figure consisting of dealer's price plus a certain percentage (to be fixed by each company individually) representing the probable cost to the consumer. To avoid the constant use of a printed consumers' or adjustment list, it is suggested that various proportions of the percentage thus secured be expressed by percentages of dealers' prices and that these only be used in making adjustments. For example: Price to dealer, \$40, plus, say, 42.9 per cent to obtain the equivalent of a 30 per cent discount from what used to be the consumers' list equals \$57.15, representing price consumer probably pays. Assuming tire has given only half service, entitling the consumer to another for half the price of the original, or \$28.58, this amount is 71.5 per cent of \$40, the dealer price. Consequently, in absence of consumers' or adjustment list, the purchaser may be asked to pay 71.5 per cent of dealer's price instead of one-half or 50 per cent of what was formerly the consumer list price. In other words, 71.5 per cent of the dealer's price is the same amount as 50 per cent of the former consumers' list."

It was suggested that this ratio could be used in working out adjustments for any dealer price and to fit any degree of wear. The following examples were given: One-quarter former list equals 35.7 per cent of dealer's price; four-fifths of former consumer list equals 114.3 per cent of dealer's price.

One of the large manufacturers which has abolished the consumer list announced an adjustment system based on the theory that the dealer would mark up his price one-third in order to establish the retail price.

Other subjects of discussion included spring dating and balloon tires. The recent modifications of spring dating recommended by the association were

discussed, but no action was taken. There were indications, however, that practically all manufacturers will abolish the five per cent cash discount and substitute a two per cent cash discount.

There was considerable disagreement as to the future of balloon tires, the predominance of opinion seeming to be that it would not be wise for manufacturers to invest heavily in equipment for the manufacture of balloon tires.

Here's a Christmas Sales Suggestion

BOSTON, Nov. 3.—At a meeting of the Bay State A. A. one of the officers made a suggestion in line with the idea of helping the trade make sales during the Christmas holiday season. He suggested that the motor dealers, tire men or others, who were in the habit of passing out merchandise checks to their employees or friends to buy hats, gloves or neckties, should find out which ones own motor cars—as about all of them do—and give them orders on some of the accessory stores to get something for their cars.

In other words he said the trade should help the trade, and he asked those present to pass the idea along.

STOCKHOLDERS ASKED TO BUY

MILWAUKEE, Wis., Nov. 5.—Stockholders in the Winther Motors, Inc., bankrupt, Kenosha, Wis., and the new Winther Motor Co., organized with \$500,000 capital by the stockholders' protective committee which bought the assets, have been invited to invest in stock of the Amalgamated Motors Corp., which is effecting a financial merger of the Winther interests and the Bessemer Motor Truck Co., Grove City, Pa., the American Motors Corp., Plainfield, N. J., and the Northway Motors Corp., Flint, Mich.

THESE DEALERS ORGANIZE

VANCOUVER, B. C., Nov. 3.—The Automotive and Gasoline Dealers' Section of the Retail Merchants' Association of Vancouver has been organized with a membership of about 100. Officers were elected as follows: President, H. B. Nielsen; first vice president, J. E. Madill; second vice president, O. L. Purcell; secretary, W. Noble; treasurer, A. R. Higgins.

INCREASE SHOW SPACE

WASHINGTON, Nov. 3.—Indications that Washington automobile dealers will have a busy winter is given in the fact that the closed car show has justified an increase display in the sales rooms. The managers declare that from the point of interest, the show has never been surpassed in this territory.

ORDERS 500 TAXICABS

PHILADELPHIA, Nov. 3.—An order for 500 White taxicabs has been received by the Philadelphia White Co. branch from the Quaker City Cab Co., of which C. S. Jarvis is president.

300 Motor Tourists a Day Invade Southern California

Since 1921, Number of Cars From Other States Doubles Each Year

LOS ANGELES, Nov. 3.—Tourist automobiles from other states are coming into southern California now at the rate of about 300 a day, indicating that the winter touring this year will be greater than ever before. The number of cars coming this year is practically twice that of last year. These cars come from all sections of the United States and Canada. Car dealers and maintenance shop proprietors in southern California realize that these visiting cars mean a large volume of business and are prepared to take care of them.

Since 1921 the number of automobiles from other states entering California has practically doubled each year. The best available figures for 1921 indicate that in that year approximately 117,000 foreign cars entered the state. It was estimated that the passengers in these cars expended a total of \$96,566,456, or an average of \$3.75 a day per passenger.

During 1922 the number of cars entering the state was 234,806, carrying 936,403 passengers. It was estimated that the average period of stay of these motorists was 55 days and the average daily expenditure \$4 a passenger. On this basis the amount expended during the year by visiting motor tourists was approximately \$205,568,660. This includes meals, housing, motoring supplies and other items.

Records kept so far this year indicate that the volume for 1923 will be double that of 1922.

In addition to the tourists who drive their cars into California, there are many, especially in the winter, who come by train and ship their automobiles. Still others who come by train buy cars here for use during their stay and then either drive them home or sell them. There is no accurate estimate of the number of either of these classes, but it is certain that they also bring a large volume of business to the automotive trade in California.

SUIT AGAINST PREMIER

INDIANAPOLIS, Nov. 3.—Suit was filed against Premier Motors, Inc., by H. H. Woodsmall & Co., Inc., here this week and the appointment of a receiver was asked on the allegation that the company had failed to pay \$557, said to be due as premiums on insurance policies written for the Woodsmall Company by the Republic Casualty. Judgment of \$600 was asked for. Both Frederick I. Barrows, president, and A. E. Dixon were out of the city when the suit was filed. Return dates on the complaint were fixed at Nov. 10. Appointment of a temporary receiver was asked for until the hearing on the complaint to make it permanent could be held.

Garage Census Shows Need of Millions of Accessories

Canvass Reveals Market for Nearly Nine Millions of Dollars in Equipment

ST. LOUIS, Nov. 3.—To determine just what the market condition for automotive accessories in St. Louis is, R. E. Lee, secretary of the St. Louis Automobile Dealers' Assn., sent scouts out at night to 10 different garages and told them to take a census of the cars found to ascertain just what each car might need in the way of accessories.

Proceeding on the estimate of 100,000 passenger cars in St. Louis, Lee took the figures supplied him by his helpers and by comparison reached the following conclusions regarding the accessory needs here:

114,640 bumpers	at \$20.00	\$2,292,800
35,567 motor meters	at 7.50	266,752
73,195 parking lights	at 2.00	146,390
67,525 winter fronts	at 25.00	1,688,125
56,701 shock absorbers	at 15.00	850,515
18,557 speedometers	at 15.00	278,355
42,793 sun visors	at 5.00	213,915
58,763 windshield cleaners	at 3.00	176,289
7,732 extra tires	at 15.00	115,980
47,938 tire locks	at 3.00	143,814
27,835 full sets tools	at 5.00	139,175
87,628 mirrors	at 3.00	262,884
94,330 side wings	at 12.00	1,131,960
73,196 sets of chains	at 6.50	475,774
100,000 sets of spark plugs	at 2.50	250,000
85,052 ventilators	at 4.00	340,208
		\$8,990,976

So to impress forcibly on the accessory dealers the opportunities for sales that exist, Lee has had these figures set up on cards and they are placed on the walls of the office of the Dealers' Association so that all those who enter may look upon them. They make a very strong impression on the dealer as he examines them and at the bottom of the one with the total figure of \$8,990,976 worth of accessories needed in the City of St. Louis, in large letters is painted "Are You Asleep? We Say You Are!"

Chevrolet Dealers Work on Plans for Spring Business

MILWAUKEE, Nov. 5.—Chevrolet dealers in the Wisconsin and Upper Michigan territory have been called into community conferences during the past ten days by C. J. Gates, sales manager of the Janesville, Wis., plant of the Chevrolet division, General Motors Corp., to discuss winter and spring business prospects and arrange for proper distribution of allocated volume. The first was held in Janesville for southern Wisconsin dealers, numbering 200. Another was held at Escanaba, Mich., for 105 Upper Michigan dealers, and a third at Green Bay, Wis., for 175 northeastern Wisconsin dealers.

Making automobile sales an all-year proposition by erasing the imaginary barriers separating each year into seasons, was stressed by Sales Manager Gates and L. K. Cooper of Chicago, re-

gional sales director. Ten bankers attended the Janesville meeting, and bankers also were invited into the other district sessions.

Dealers in general reported business active and that their effort was to get more good salesmen, rather than laying off any of existing staffs.

L. I. Stewart, plant manager at Janesville, announced that production was being stepped up in November, and that the schedule for January calls for 6,500 cars, with further increases in February to reach an output of 7,000 cars in March.

Plan Clinic to Demonstrate Use of Service Equipment

BOSTON, Nov. 5.—Manufacturers making up the New England group of the Service Equipment Associates are planning a service equipment sales promotion clinic for the first or second week in January. At that time they will show all the equipment made by these manufacturers and have men on hand to demonstrate to jobbers' salesmen representing firms who are selling these products to dealers and garagemen.

The clinic was decided upon at a meeting arranged by the New England manufacturers and attended by themselves and their sales managers and representatives of 14 jobbing houses in the territory. All the jobbers present agreed to have their sales staffs attend the clinic, which will continue for a week. The object is to prepare the jobbers' salesmen better to sell garage tools and machinery.

The jobbers attending the conference also agreed to use the Golden Rod stock adopted by the Service Equipment Associates for the service equipment sections of their catalogs.

CHARLOTTE SHOW DATE

CHARLOTTE, N. C., Nov. 5.—The Charlotte Automotive Trades Association at its meeting this week decided to hold its fourth annual automobile show early next March, beginning the first Monday and extending through the week to Saturday night. Appointment of committees to handle the affairs were left in the hands of the president, T. M. Glasgow, and the directors of the association.

BOSTON SHOW MARCH 8 TO 15

BOSTON, Nov. 2.—The Boston Automobile Show will be held March 8 to 15, in the Mechanics Building, under the auspices of the Boston Automobile Dealers' Association, Inc., and the Boston Commercial Motor Vehicle Association, Inc. The general manager is Chester I. Campbell.

NEW CHEVROLET SHOP

TOLEDO, Nov. 3.—A contract has been let for the construction of a new \$100,000 shop as an addition to the local plant of the Chevrolet Motor Ohio Co., which manufactures transmissions for Chevrolet. The new building will be at Maplewood and Central Avenues, adjoining the present plant.

GMC Calls Special Meeting of Stockholders for November 26

Wilmington, Del., Is Where Owners Will Congregate to Discuss Managers' Securities Co.

NEW YORK, Nov. 5.—General Motors Corp. has called a special meeting of stockholders to be held in Wilmington, Del., Nov. 26 to vote on a plan worked out by the directors which is designed to bring about 70 of the principal executives of the corporation into close partnership relations with the stockholders.

If the idea is approved this will be brought about through a company to be known as the Managers Securities Co. made up of executives to be named by a special committee who will be permitted to purchase 2,250,000 shares of common stock in General Motors, having a present value in excess of \$33,000,000. Each executive will pay \$2.20 per share in cash and the balance of \$12.80 will be deferred payments spread over seven years which will be paid in General Motors dividends collected by the Managers Securities Co. and by an annual contribution made by General Motors. This last will be 5 per cent of its net earnings in excess of 7 per cent on the capital employed by General Motors, which is \$500,000,000. Those participating will begin to realize on their investments at once through dividends paid by the Managers Securities Co., which in turn will meet the deferred payments with the balance of the dividends not paid to the executives and with the contribution paid from the corporation.

The plan, as explained by President Sloan is expected to "secure a better, broader and more sympathetic understanding of the stockholders' interests and therefore the interests of the corporation as a whole" on the part of the executives by bringing them into a partnership through their becoming stockholders themselves.

Philadelphia to Hold Its 23rd Show, Jan. 12-19

PHILADELPHIA, Nov. 5.—Philadelphia's twenty-third annual automobile show will be held from Jan. 12 to 19, at the Commercial Museum. This decision has been arrived at by the show committee at a meeting held in the quarters of the Philadelphia Automobile Trade Association, consisting of Louis C. Block, chairman; Walter G. Herbert, secretary; J. E. Comery, treasurer; L. S. Bowers, J. Sweeten, Jr., J. H. Pierpoint, J. G. Roberts and Ralph W. Cook.

A prize will again be offered to artists for the best poster design advertising the show. This year there will be one prize only, of \$150 for the best design, instead of two prizes, one of \$100 and another of \$50 as was the case last year. The date of the award will be noon Dec. 3, when all designs must be submitted to the Philadelphia Automobile Trade Association, Broad and Callowhill streets.

Packard Sells 21,571 for Year Ending August 31

Gross Volume Is \$55,670,464.51; Net Profit Over \$7,000,000

DETROIT, Nov. 3.—Sales of Packard Motor Car Co. for the year ended Aug. 31 were 21,571 vehicles, which compares with a total of 14,420 for 1922, according to the annual statement of the company issued this week. In dollars and cents the gross volume was \$55,670,464.51, including its service parts business, and marine and aviation engine sales. The gross profit was \$11,348,533.73, and total gross profit and income \$12,205,893.30. Net profit for the year was \$7,081,878.60. The balance at the end of the year after payment of \$15,410,293 in stock and cash dividends was \$8,676,023.67.

In his report to stockholders, President Alvan Macauley said in part:

"Earnings have been satisfactory and the company's financial structure at the end of the year shows unusual strength. In engineering achievements the year has been marked by the popular approval of the single six, the straight-eight and the success of the company's aviation and marine engines. Working forces are now upwards of 7,000 and of these about 12 per cent have been in the company's employ for 10 years and over, and 27 per cent for five years or longer.

"The working efficiency of this organization is indicated by the fact that with very little increase in plant investment the company has been able to develop and perfect the straight-eight; to successfully introduce it upon the market; to get it into full production, and to produce the greatest number of vehicles in the company's history. The company's points of distribution have increased during the year from 699 to 798, giving the company distributive outlets in all important centers.

"It is hardly too much to say that Packard cars have been pre-eminent in the automotive industry during the year. An indication of this is the effort of other manufacturers to imitate the single-six; it can fairly be said that this has been one of the most popular cars ever built, both from the standpoint of its own sales and the favor with which it has been received by the public as well as by other manufacturers. More than 30,000 single-six cars are satisfying the demands of their owners.

"For several years we have given much study to the development of a car which should have all the power, smoothness and flexibility of the twin-six without the inaccessibility of the V-type motor. The success of the new Packard straight-eight with its remarkable simplicity and economy of operation and upkeep has been most gratifying. Sales are months in advance of our ability to deliver, although we are now shipping the straight-eight at the rate of 6,000 yearly. The outlook for the coming year is favorable. Fall business has been encouraging and we look with confidence to the future.

"Assets of the company are shown as \$21,626,917.31 under factory account, and \$33,001,600.28 as current. The company has cash and marketable securities of \$16,636,104.60, accounts receivable of \$2,914,270.78 and inventories of \$12,574,400.77, of which \$2,891,347.29 is in finished cars and trucks. Comparing the current assets with last year, there is a decrease of about \$1,100,000 in inventories; about \$300,000 less in accounts receivable, and an increase of about \$350,000 in cash and securities. Rights, privileges, franchises and investments are carried at \$1.

"Current liabilities of \$5,814,348.09 show an increase of about \$1,350,000 over the previous year, and capital stock outstanding with the common stock dividend of 100 per cent, totaled \$38,446,400, an increase of about \$11,800,000. Preferred outstanding was reduced \$113,600 during the year. Gold bonds outstanding of \$7,400,500 were retired. Reserve for contingencies was increased from \$750,000 to \$2,000,000. Dividends in cash during the year totaled \$1,029,322 on preferred at the regular 7 per cent rate, and \$2,495,871 on common, a rate of 10½ per cent. The book value on common is shown as \$13.65 a share.

"Of the net profit for the year, \$1,396,945 was from the operation of branches and subsidiary companies, which compared with a loss of \$357,126.96 in 1922. The profit from factory operations this year was \$5,684,933.58 which compares with a profit from this source of \$2,472,955.10 in 1922."

Last Chance to Get N. A. D. A. Accounting System, Dec. 1

ST. LOUIS, Nov. 3.—Some time ago the headquarters of N. A. D. A. issued an announcement that their cost accounting system for automobile dealers was ready and that the books to be issued would cost \$20 apiece and that work would proceed with the printing of the books as soon as 500 dealers had sent in their applications and checks for the system, provided that number had subscribed by Oct. 15.

Upon that date not enough checks had been received, so with the consent of those who had already sent in their money, the N. A. D. A. continued the final date to Dec. 1, when all applications must be in or the checks already received will be returned.

START CHRISTMAS CAMPAIGN

SPRINGFIELD, O., Nov. 3.—In conjunction with an elaborate Christmas selling plan and campaign to be put on by accessory and garage men the film "An Automotive Christmas" was shown at the rooms of the Chamber of Commerce, followed by a smoker. The slogan for the campaign is "Something for the Car for Christmas". The dealers expect the sale of accessories to reach a high volume during the Christmas season. They have already started work changing and improving their display windows.

Motor Truck Industries, Inc., Opposes Factory to User Plan

Whittaker Calls Such Policy First Step Toward Bankruptcy of Factories

DETROIT, Nov. 3.—Directors of Motor Truck Industries, Inc., went on record this week in opposition to merchandising motor trucks from the factory to user and adopted resolutions condemning such practices as harmful to purchasers of trucks, unfair to existing dealer organizations, and destructive to the industry as a whole. The action of the directors is summarized in the following statement by Don F. Whittaker, secretary and general manager of the association:

"That the past history of the industry has shown such direct from factory to user plans the last resort of manufacturers headed toward liquidation, in practically every instance. If such manufacturers do continue in business for any length of time their interest in the purchaser of a truck usually ceases at the time the sale is made. The plan having been resorted to after failure to otherwise dispose of materials, it is frequently the case that materials find their way into the chassis which are either obsolete or in poor condition because of the time they have been on hand. This condition cannot help but result in dissatisfaction on the part of the purchaser.

"In every instance we know of, manufacturers who have resorted to this merchandising idea have been unsuccessful and are no longer in business. This policy and plan is quite in keeping with the policies which usually preceded and which result in the factory's inability to attract dealers, or keep them after dealer relations have been established.

"We have yet to learn of one case where the direct from factory to user idea has worked out satisfactorily. Every successful company in the business today has built its success on the provision of localized sales and service. Representation is either through dealers, through factory branches or a combination of both, providing a more or less constant output, assuring units up-to-date in design and providing the kind of service which plays a large part in the satisfactory operation of the vehicle.

"The dealer or factory branch is a very essential part of the motor truck industry."

DETROIT HEARS APPLEBY PLAN

DETROIT, Nov. 3.—Dealers of the Detroit district will have the complete details of the Appleby used car plan placed before them at a meeting Nov. 6 to be held in the General Motors Building. The meeting will be under the auspices of the Detroit Automobile Dealers' Association but will be open to all dealers of Detroit, whether members of the association or not, and in addition, factory sales managers from all factories in the district will be invited to attend.

October Sales in Chicago Better Than in September

Enclosed Cars in Good Demand and Some Dealers Are Behind With Deliveries

CHICAGO, Nov. 3.—Automobile sales in Chicago in October were considerably greater than in September, the increase being due largely to the demand for enclosed cars. The enclosed car show held at the Coliseum early in the month was highly successful from a sales standpoint and the interest created at that time is still potent in helping business.

Many of the dealers handling popular lines are again encountering a shortage of enclosed cars for immediate delivery, while others are just about keeping even with orders. There is practically no stocking of cars by dealers beyond their seasonal needs.

Reports of some of the large automobile financing concerns show October business running in the neighborhood of 10 per cent greater than September business and as much as 15 per cent greater than October last year. Some of these

firms report the proportion of cars sold on time showing a slight increase.

The used car market is very dull except for the enclosed vehicles in fairly late models, which are in good demand. Prices of used cars are unusually low and open models find very little demand even at prices which would have been considered impossible a few months ago.

Dealers are expecting a continuance of business on about the present level until the first of the year, and they look forward to an increase immediately after the show season.

SALESMEN'S SCHOOL

NEWARK, N. J., Nov. 2—The Newark Automobile Trade Association has virtually decided to undertake organization of a school for automobile salesmen. It is intended to provide instruction to develop men already in the business and to attract trained men from other fields.

The association committee handling the project has not decided yet whether the school will be undertaken in connection with the Y. M. C. A. or another outside institution or whether it will be handled as an exclusive activity of the association.

50-Year-Old Steam Car Still Runs



PARIS, Oct. 16—(By Mail)—Built in 1873, the Amedee Bollee 12-passenger steam automobile was feted this week at Le Mans as the oldest motor vehicle in the world, the demonstrations including a triumphal run round the permanent race circuit outside the city with the President of the Automobile Club of France among the passengers and the son of the builder of the car at the wheel.

Amedee Bollee, a bell manufacturer at Le Mans, where he employed about 40 hands, began the construction of his steamer "l'Obeissante" in 1872 and finished it in 1873.

Permission having been secured from the French Government to make use of

the roads, the steamer made a journey to Paris in 1875, covering the 128 miles in 18 hours, all stops included. L'Obeissante is a four wheeler with a boiler at the rear and two open-V engines placed on each side, each one driving a rear wheel through a sliding gear mechanism and a side chain. It has central pivot steering through a vertical column with steering wheel and chains.

Amedee Bollee built this machine in one year at a time when the only available materials were cast iron, mill steel and bronze. The car has remained in the hands of the family and was driven on the occasion of its jubilee by Amedee Bollee, Jr., who, at the age of six, was one of the passengers on the first trip made by the veteran.

Studebaker Builds More Cars, Makes More Money Than 1922

First Three Quarters of 1923 More Than Equal All of Last Year's Record

SOUTH BEND, Ind., Nov. 3.—For the first three-quarters of 1923 the Studebaker Corp. built and sold more cars and made more money than in the whole of 1922 and the latter year was an exceptionally good one. In the first nine months this year the corporation produced 124,155 cars as compared with 87,951 in all of 1922, and the balance it has left for dividends is \$18,226,254 as compared with \$15,640,374 for the full 12 months of 1922.

These facts are brought out in the report just issued for the quarter ended Sept. 30, which shows net sales in that quarter of \$46,372,646 against \$35,065,894 in the corresponding period last year. After allowing for all expenses and reserves and deductions for Federal taxes there was reported net profits for the quarter of \$4,855,079 against \$4,483,973 last year. After dividends on the preferred stock the balance available for the \$75,000,000 common stock in the third quarter was equal to \$6.27 a share against net profits equal to \$5.64 a share reported for the same stock last year.

The statement of earnings for the nine months shows net sales of \$139,021,191 against \$108,488,756 in the corresponding period last year. After all deductions net profits for the period aggregated \$18,226,254, which, after allowing for dividends on the preferred stock, was equal to \$23.68 earned on the common stock. In the first nine months of 1922 there was reported a balance available for the common stock equal to \$20.23 a share.

Commenting on the report, President Erskine says: "Business during the third quarter held up to expectations. The number of cars sold and the net profits realized were very satisfactory. The decline in the net profits per car as compared with the second quarter was due to the greater proportion of sales of Light Sixes and of open models, on which the profits are smaller than on closed models. For the nine months we sold 122,586 cars and realized net profits of \$18,226,254. Both figures exceed the results of the entire year of 1922. Our business for the fourth quarter will be slightly below that of the third quarter, but a substantial volume is assured."

U. S. WANTS MECHANICS

WASHINGTON, Nov. 3—The United States Civil Service Commission announces that applications will be received until Nov. 27 for examination for appointment as automobile mechanic. The examination is to fill vacancies in the Government service at entrance salaries of \$720 to \$1400 a year plus the bonus of \$20 a month granted by Congress. Competitors will not be assembled for examination, but will be rated on their physical ability, training and experience.

Atlanta Dealers Contemplate General School of Instruction

Fall and Winter Months to Have Class Meetings Regularly

ATLANTA, Ga., Nov. 5.—Pledging its membership to do everything possible to improve and increase the efficiency of those employed in the sales departments of the various Atlanta automobile, accessory and equipment dealer organizations, the Atlanta Automobile Association is contemplating the establishment of a general school of instruction for salesmen to be conducted here during the coming fall and winter months.

It is the present plan to have the school in operation as soon as the arrangements can be completed, and to hold regular classes in salesmanship and merchandising, at stated intervals during the next few months. The course will be open to any salesman employed by any member of the association, which includes practically the entire automotive industry of Atlanta and suburbs. Instructors will be in charge who are recognized experts in salesmanship and merchandising, and who are actively engaged in this branch of work in the automotive industry in Atlanta.

Special attention will be given to each department of this business separately—that is, accessory and equipment sales, tire sale, automobile sales, truck sales, used car and truck sales.

CLIFFORD JOINS THE CLASS JOURNAL CO.

NEW YORK, Nov. 2.—Arthur E. Clifford will join the Class Journal Co. Nov. 12 as business manager of Automotive Industries, to devote himself to the analysis and development of advertising. Clifford comes from the McGraw-Hill Co., and has back of him 31 years' experience in business paper publishing.

Clifford started with the Electrical World and was business manager of that paper when he joined the Street Railway Journal in a similar capacity. When that publication became the Electric Railway Journal he returned to the business management of Electrical World and then for seven years acted as business manager of the American Electrician, which was merged with the Electrical World. He also was business manager of the old Engineering Record but again returned to his former duties with the Electrical World, later adding to his work the business management of Electrical Merchandising. More recently he has been engaged in general executive work with the McGraw-Hill Co., publisher of the foregoing papers.

TO PAY CREDITORS SOON

LOUISVILLE, Nov. 6.—Creditors of the Kentucky Wagon Manufacturing Co. will be paid in full at an early date, according to a report filed in Federal court by James R. Duffin, attorney for the

company, and sworn to by Robert V. Board, president.

Through the amended petition, creditors will receive 10 cents on the dollar of their claims at once, and 45 cents from the inventory of the company when it is turned out in manufactured goods. The remainder of the debts will be paid by notes of the National Motors Corporation.

"Passenger" Car Gets Official O. K.

ALBANY, N. Y., Nov. 3—*The State Tax Commission has amended its 1924 application blank for the registering of privately owned and privately operated automobiles so that this class of vehicle will be designated passenger car instead of pleasure car, thus officially recognizing that the automobile is a necessity and not a luxury.*
The Commission also has made a change in the application blank in question No. 5, which, in the present blank, is as follows: "Year of manufacture." The new blank will require the applicant to state "manufacturer's year." This will make it possible for the dealer selling a car manufactured in yearly models to answer the question honestly in the first three months of each year and still not make the car appear older than it actually was when it was delivered new.

U. S. ISSUES TRADE MANUAL

WASHINGTON, Nov. 5.—After months of careful study the Automotive Division of the Department of Commerce has issued the "Automotive Foreign Trade Manual." Several hundred copies of the manual have been sent out to the trade this week in an attractive binder.

MOTOR PRODUCTS REORGANIZING

DETROIT, Nov. 3.—Stockholders of Motor Products Co. are to act at a special meeting Nov. 7 on a plan to reorganize the company as the Motor Products Corp., by which the new company will be capitalized on the assets of the present company.

The new company will have a capitalization of 62,500 shares of preferred and 67,500 shares of common. The preferred will pay \$4 a year and have liquidation and redemption value of \$50 and accrued dividends. There will also be \$6,750,000 of 6 per cent 20-year sinking fund gold bonds.

WARNS GASOLINE COMPANIES

SALT LAKE CITY, Utah, Nov. 3.—Attorney General H. H. Cluff claims that the petroleum industry has been extracting outrageous profits and he has served notice on the industry that better prices must be brought about. He threatens to "use every means at his disposal" in an effort to correct conditions, going to the legislature, if necessary. The Utah attorney general has just returned from the Chicago conference.

Retail Sales Managers in Detroit Form Association

Purpose Is to Promote Closer Acquaintance and Improve Conduct in Selling Automobiles

DETROIT, Nov. 3.—In order to promote closer acquaintance and co-operation, the retail sales managers of this city have organized the Detroit Automobile Sales Managers Association. About 60 members have been enrolled from men associated with firms belonging to the Detroit Automobile Dealers Association and auxiliary dealers.

The new organization is starting out with three basic policies which will be amplified and further subdivided as its form of effort and policies crystallize. At present, attention is being centralized on the three following objects:

Promotion of closer acquaintance.

Improvement of the conduct of sales of automobiles.

Educational features for members.

In pursuance of the third policy, the next meeting of the association, which is to be held Nov. 14, will be featured by a talk on sales methods and their improvement, by Norval Hawkins.

Temporary offices have been established in the General Motors Building, although it is thought that any permanent office will be established in close touch with the headquarters of the Detroit Automobile Dealers' Association. The officers of the new organization are placing emphasis on the fact that its efforts and aims are those practically applicable to the retail sales manager's problems. The following officers have been elected: President, Wade Polling, Owen & Graham; vice-president, Thomas Walker, Simon Sales Co.; secretary, C. W. McGannon, Bemb-Robinson Co.; treasurer, Pat O'Day, Thomas J. Doyle Co.

GEN. BUTLER DECLINES JOB

NEW YORK, Nov. 3.—Brig. Gen. Smedley D. Butler has declined the appointment of general manager of the American Automobile Association, which was tendered him by President Thomas P. Henry. Gen. Butler gave the proposition careful consideration but the appeal of the Marine Corps won out and he decided to stay in the service.

PROSPERITY IN CALIFORNIA

OAKLAND, Cal., Nov. 2.—Prosperous conditions are still prevalent in the automotive merchandising field in California, judging from the figures on September sales collected by "Motor Registration News," a statistical paper issued here. The total registration of automotive vehicles in this state for September, 1923, was 18,231, an increase of 17 per cent over the registrations of the same month in 1922, when 15,746 sales were recorded.

CONCERNING MEN YOU KNOW

R. A. Olsen has been appointed sales manager for the Tuthill Spring Co., Chicago, succeeding H. C. Wright, who has entered another field. Olsen will also continue to have charge of advertising. G. M. Youngkrantz has been added to the Chicago sales force and will probably call on the jobbing trade of the west, north and central territory.

A. B. Root, a veteran of the New York Automobile Row, has resigned from the retail sales force of the New York Peerless branch after a service of seven years to become vice-president and general manager of Casper Lubricants, Inc., blenders of high speed lubricating oils under the Casper cold pressed white Caster oil process.

J. M. Malmo was recently appointed branch manager of the Advance-Rumely Thresher Co., Inc., at Fargo, North Dakota, to succeed A. J. Donovan, who has gone into business for himself. Malmo was formerly Advance-Rumely branch manager at Regina, Saskatchewan, and is succeeded by Frank Maloney, formerly assistant manager. A. H. Schnell, formerly assistant manager at Regina, has been appointed assistant manager at Aberdeen.

Monogram Lens Corp., 52 Vanderbilt avenue, New York City, announces the appointment of W. G. Armstrong as treasurer and general manager. Armstrong's headquarters will be at Room 1015, 52 Vanderbilt avenue, New York City.

Harrison Boyce, vice-president and general manager of the Moto-Meter Co., Long Island City, N. Y., sailed recently for Europe. He will visit England and France and will be gone about a month.

Fred Wilson, who recently resigned as sales manager of the Stutz Motor Car Company, and Lon R. Smith, who was formerly connected with the Buda Company and the Midwest Engine Co., have launched a merchandising and sales organization under the name of Smith & Wilson, Inc. They propose to furnish a complete merchandising service to a list of non-competing clients. Smith recently has been connected with the Lubac Corporation and it is understood that his company will be one of the new organization's clients.

E. A. Riedinger, who has been associated with Guy Wilson in St. Louis for a number of years, has been appointed sales manager of the Victor Motors, Inc., a company recently organized to produce trucks, busses and taxicabs.

Insurance paid on the policy of the late M. H.

Number of Sub-dealers in Los Angeles on Increase

LOS ANGELES, Nov. 6.—Extension of sales policies by a number of the local distributors to include sub-dealer agencies in the city of Los Angeles has become a growing custom. Until recently the Ford was the only make of car to have more than one representative. The Overland organization was the next to expand by appointing local dealers. The Oakland, Maxwell, Star, Durant, Chevrolet and others have followed. The appointment of city dealers by the Peerless is the first move of the kind by representatives of the higher-price lines. Buick and Studebaker distributors have established their own sub-branches within the city.

A change of more than local interest in factory activities was the appointment of R. J. Faneuf as a coast representative for the Durant. He has been succeeded here as manager for the Durant-Steves organization, the distributors, by F. H. Schreiner who has been prominent in automobile sales activities since 1913.

RICHMOND DEALERS ELECT

RICHMOND, Va., Nov. 5.—At the annual meeting of the Richmond Automotive Trade Association this month the

Hewitt, tire manufacturer of Buffalo, N. Y., amounted to \$150,000, according to the Insurance Press, a New York publication. It was the largest policy paid in Buffalo last year.

Carleton J. Lauer, formerly chief engineer of the Detroit Steam Motor Corp., of Detroit, has become chief engineer of the Brooks Steam Motors, Ltd., 1304 C. P. R. Building, Toronto, Ont.

Harry E. Rotert, for the past four years representing the sales engineering division of The Timken Detroit Axle Co., announces his association with The Damascus Manufacturing Co. of Cleveland, Ohio, with headquarters in the Marquette Bldg., Chicago.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, has been elected president of the American Association of Trade Executives, which consists of the managers or other executive officers of 158 trade associations producing everything from asphalt to zinc and representing the key industries of the country.

David Ferguson, for 20 years chief engineer of the Pierce-Arrow Motor Car Co., of Buffalo, has joined the staff of James Cunningham Son & Co., Rochester, N. Y., in the capacity of chief engineer.

H. H. Brenner, who for a number of years was connected with the I. J. Cooper Rubber Co., of Cincinnati, and later representing the Cooper company in St. Louis and Kansas City, has returned to Cincinnati, joining the Cincinnati Storage Battery Co. as chief of the sales department.

L. M. Baker, former wholesale manager of the Hyatt Roller Bearing Co., has been appointed Detroit representative of the Bassick Manufacturing Co. of Chicago, manufacturer of the Alemitre lubricating system, with headquarters at the Alemitre Lubricator Co., 4750 Woodward avenue.

R. H. Collins, president and general manager of the Peerless Motor Car Co., of Cleveland, returning from a visit to California and the Pacific Coast, reports business good and no sign of abatement in buying. Peerless sales in California, he states, show an increase of 166 per cent for the first nine months of this year over the same period last year.

Bernard Doyle has been appointed general manager of the Oldsmobile Company of Baltimore, Md., of which Frank L. Olmstead is head.

following officers were elected: President, J. A. Kline; vice-president, E. F. Taylor; secretary, H. M. Figgatt; treasurer, J. H. White. Kline was re-elected for his sixth term as president. Figgatt is serving his third term as secretary.

The association is working actively in support of the proposal for a \$50,000,000 bond issue for hard roads, which will be voted on at the November election. It was decided to hold a great torchlight parade of dealers and car owners the night preceding the election and to provide all dealers in the state with windshield posters advocating the bond issue, for distribution among owners.

G. M. WINS SHERIDAN SUIT

WILMINGTON, Del., Nov. 6.—The United States District Court has rendered a judgment in favor of the General Motors Corp., defendant in a suit brought by Charles Chalmers, who claimed \$50,000 damages for sums alleged to have been expended in the formation of a sales company in Philadelphia to handle Sheridan cars. Chalmers claimed that the new car was not put into production on a large scale and was in fact discontinued. The Sheridan was the latest addition to the General Motors group prior to the retirement of W. C. Durant, the plant being located in Muncie, Ind.

Plans for N. A. C. C. and S. A. E. Meeting Completed

Service Managers to Convene at Dayton, Ohio, Nov. 20-21

NEW YORK, Nov. 3.—Plans for the service managers' meeting to be held at Dayton, O., Nov. 20-21 under the joint auspices of the National Automobile Chamber of Commerce and the Society of Automotive Engineers are about completed.

As the card has been arranged the opening address will be delivered by C. F. Kettering, past president of the S. A. E. and president of the General Motors Research Corp. The meeting also will listen to an outline of the N. A. C. C. service division platform in advance of its being presented to the directors of the Chamber.

Among the outstanding features of the program will be a discussion of "The Evils of Headlamp Dimming and Instructions on Adjusting," by R. E. Carlson of the United States Bureau of Standards; "Lessons of Value to the Engineer From the Flat-Rate System," by J. Willard Lord, president of the Automotive Service Association of New York and service manager of the Harrolds Motors Co.; "A Successful Method to Assist the Engineer to Correct the Faults of Design," by L. T. Kreusser, co-ordinating engineer of the General Motors Research Corp.; "The Evils of Crankcase Dilution and How to Educate the Public," by E. F. Hallock, manager of the manufacturers' division of the Vacuum Oil Co.; "Selling Service," by W. L. Wise, service manager of the National Cash Register Co.; "Electrical Repair Problems as Encountered by the Garage Repair Man," by P. J. Durham, secretary of the Automotive Electric Service Association and president of the P. J. Durham Co., of New York, with discussions prepared for these various papers by recognized authorities on automobile lighting, lubrication, electrical service and other related subjects.

REPRESENTATIVES NOT WANTED

PITTSFIELD, Mass., Nov. 3.—Secretary C. J. Billedeau, of the Federation of New England Motor Clubs, has been notified by President Ludlow that the request of the association to be allowed to participate in and cooperate with the Motor Vehicle Registrars when they have their conferences has been turned down. Secretary Billedeau is notifying the clubs that Commissioner Dill, of New Jersey, who is chairman of the conference, has stated that while the conference would like suggestions it could not allow participation now of motor vehicle club representatives.

FRISCO SHOW FEB. 16-23

SAN FRANCISCO, Nov. 5.—The eighth annual Pacific Automobile Show will be held here Feb. 16 to 23 at the Exposition Auditorium under the auspices of the San Francisco Motor Car Dealers' Association. G. A. Wahlgren is manager.

BUSINESS NOTES

Lyk-Glas Auto Painting Corporation of Maryland, 1213 Fidelity Building, Baltimore, has been incorporated with \$150,000 capital stock to paint automobiles, etc. The incorporators are Harry D. Eastman, George H. Martin and N. Paul Fries.

Williams Bros. Aircraft Corporation, 25th and Potrero avenue, San Francisco, manufacturer of Williams accelerators, has moved into the first unit of the new factory where it will have much better manufacturing facilities.

Master Piston Corporation, 144 West Mt. Royal avenue, Baltimore, has been incorporated with \$250,000 capital stock to manufacture and deal in pistons, piston rings, dies, tools, etc. The incorporators are Jesse T. Dowling, Thomas J. Levey and William T. Bowers.

Creditors of the former Batavia Rubber Co., which went into the hands of receivers about a year ago, are receiving final settlement of their claims, which amounts to about two-thirds of one per cent. Assets of the defunct company were sold to about 90 per cent of the creditors, who had formed an organization known as the Batavia Holding Corp.

H. M. Fredericks Co. of Lock Haven, Pa., armature rewinding specialists, have moved into their new plant occupying approximately 10,000 feet of floor space and have increased their capacity to 1,500 rewinding jobs per day.

Eagle Motor Truck Corporation of St. Louis has added a new model to its line. It is a truck designed to handle a three-ton load and equipped with a hydraulic hoist flare-board dump body.

Standard Auto Parts Co., St. Louis, has changed its address to Compton avenue and Locust street after having been for a number of years at 3931 Olive street.

American Bosch Magneto Co., which some time ago purchased the plant of the Reading Standard Motorcycle Co., Reading, Pa., has just sold it to Keyser Fry, of Reading, who will occupy it

with a bicycle and accessories jobbing business.

C. C. Bulkeley, former executive secretary of the Philadelphia Automobile Trade Association, was chief speaker at the first fall meeting of the Bethlehem, Pa., Automobile Trades Association, his topic being, "How to Form An Efficient Automobile Dealers' Association," and he added some remarks on the importance of observing trade ethics.

Howard B. Armstrong, chairman of the entertainment committee of the Motor Truck Association of Philadelphia, and formerly with the tire distributing firm of O'Brien & Hoover, has left Philadelphia to become manager of the truck department of the Dunlop Tire & Rubber Co. of Buffalo, N. Y.

Moto-Meter Co., Long Island City, N. Y., which adopted a service station policy something more than a year ago for the distribution of its product, now has 16,000 official service stations covering virtually all sections of the country.

James F. Ball Service Station, 222 North Third street, Columbus, O., has arranged to give free instruction in automobile mechanics covering a period of three weeks. The classes will be on three evenings a week and J. F. Ball, formerly an instructor in the Y. M. C. A. Automobile School, will be the instructor.

Corduroy Tire Co. of Grand Rapids, Mich., has made the announcement that October business was the largest in the history of the company.

R. T. Auerbach, president of the Missouri Rubber Products Co., manufacturers of automobile tires and tubes, has announced that the company has decided to establish permanent headquarters in Springfield, Mo., and erect a plant at an approximate cost of \$1,500,000, on a site yet to be selected. The Missouri Rubber Products Company is made up of the Montford Rubber Co., the Orville Tire and Rubber Co., and the Wayne Tire and Rubber Co., all eastern concerns.

duction and reducing capital outlay.

4—Simplification reduces cost to jobber and dealer by calling for smaller inventory and a quickening turnover.

5—Simplification reduces cost to automobile users through lower price and lower maintenance cost.

6—Simplification improves service to user by making it easier to repair and replace parts and units.

7—Simplification in the words of Emerson, means the adoption of those standards "established by investigation or authority to be a reasonably attainable maximum of desirability."

DEALERS ELECT OFFICERS

SPRINGFIELD, Mass., Nov. 5.—At the annual meeting of the Springfield Automotive Dealers' Association reports were presented showing that good progress had been made in furtherance of the organization's objects, and plans for the coming year were discussed in outline.

J. S. Harrington, Hudson and Essex distributor, was re-elected president and Harry W. Stacy secretary. Other officers are: Vice-president, H. H. Bierman, Reo; treasurer, A. V. Reopell, Chevrolet; board of governors, G. G. Byrnes, Ford; R. M. Sauers, Marmon and Hupmobile; E. R. Clark, Cadillac; C. R. Culver, Pierce Arrow; G. E. Graham, Buick; H. H. Bierman, Reo; O. L. Hunting, Franklin and Rickenbacker. The committee on the annual show comprises Byrnes, Sauers, Culver and Reopell, who will shortly fix the date of that event.

GAS 20 CENTS IN BALTIMORE

BALTIMORE, Md., Nov. 5.—Gasoline price in this city has been reduced to 20 cents, including the State tax. This brings the price to the same level it was in 1913.

Salesmanship School to Be Established at Cleveland

Dealers' and Manufacturers' Assn. Names J. S. Knox as Head

CLEVELAND, Nov. 3.—A salesmanship school is to be established by the Cleveland Automobile Manufacturers and Dealers' Association. A course will be given under J. S. Knox, head of the Knox School of Salesmanship.

The course will extend over 10 successive Monday nights and will cover the fundamentals of business and selling, to enable the respective sales managers then to build their particular structures on the foundation laid in the school.

It will be open not only to men already engaged in the selling of automobiles in Cleveland but to outsiders also who might be interested in taking the course with a view to engaging in the motor car trade. Outsiders taking the course under these conditions would be practically assured of a position at its conclusion.

Woman Demands Free Oil and Gas for Car; Flat Rate Moral

ST. LOUIS, Nov. 2.—That the sins of the fathers are visited on future generations is evidenced from a report of John O. Lowell, manager of the maintenance division of the Vesper-Buick Auto Co., who states that people who have driven their cars for many thousands of miles still come into the shop and demand free service.

But the prize demand was made by a woman who had had her car for less than 30 days and demanded free oil for the crankcase and free gasoline, on the grounds that when her father purchased a car in 1912 the dealer supplied gasoline for 90 days.

An owner who had driven his car 36,000 miles asked the price for the reconditioning of his engine and when he was told it would amount to \$135 he declared that repair bills were outrageous and that he had already spent \$19.42 in five years. But he thought the engine should be overhauled free of charge.

Lowell said that the installation of flat-rate systems of inspection and service at a nominal charge have done much to strengthen the owner's belief in the ability of the dealer's shop to look after his car.

MOORE MOTORS ORGANIZED

COLUMBUS, O., Nov. 3.—The Moore Motors Co., chartered several weeks ago with an authorized capital of \$10,000, has been organized by the election of T. E. Moore, president and general manager; F. B. Adams, vice-president and treasurer, and R. M. Hyatt, secretary. This company will be the sales agent for the MacDonald steamer. The headquarters will be at 1675 South High street, in the former plant of the Coates Steam Car Co.

Committee Gives 7 Reasons For Simplified Practice

NEW YORK, Nov. 6.—The Automotive Simplified Practice Committee, of which M. L. Heminway, general manager of the Motor and Accessory Manufacturers' Association, is chairman, has fired the first big gun in its campaign by adopting the "Seven Reasons for Simplification," as drafted by M. Lincoln Schuster of the M. A. M. A., and John C. Long of the National Automobile Chamber of Commerce.

These "reasons" are the fundamentals on which the committee's platform will be based and will be broadcast throughout the land through the official publications of the constituent members of the committee—the Aeronautical Chamber of Commerce, American Automobile Association, Automotive Equipment Association, Automotive Electric Association, Motor and Accessory Manufacturers' Association, Motorcycle & Allied Trades' Association, Motor Truck Industries, National Automobile Chamber of Commerce, National Automobile Dealers' Association, Rubber Association of America and the Society of Automotive Engineers.

The "Seven Reasons for Simplification" are as follows:

1—Simplification means standardization of those specifications and sizes in automotive construction where individuality is neither necessary nor advisable.

2—Simplification, through saving of cost and effort on many details, makes possible greater individuality with respect to those factors where distinctive style or size is an asset.

3—Simplification reduces cost to the manufacturer by permitting greater mass pro-

IN THE RETAIL FIELD

Monthly educational meetings to which all automobile owners are invited, have been inaugurated by the Sunnyside Automobile Service, 4500 Ravenswood avenue, Chicago. This company specializes in complete automotive maintenance, and the meetings will be devoted to lectures on the various phases of automobile repair work. For instance, one meeting will be on batteries, one on carburetors and another on the electrical system.

The Akron Flint Motor Sales Co. of Akron, O., has been chartered with an authorized capital of \$20,000 to sell Flint and other makes of cars and trucks. Incorporators are J. F. Sieberling, C. E. Hamlen, M. E. Fassnacht, R. L. Brannan and J. B. Huber.

The Goodfellow Garage and Sales Co., has been incorporated to succeed the West End Overland Co., an authorized Overland and Willys-Knight dealer at 5802-06 Delmar boulevard, St. Louis, Mo. G. R. Hastings is president of the new company.

Ashley L. Papin, a salesman for the Western Automobile Co., Pierce-Arrow distributor in St. Louis, won the weekly prize offered by the Pierce-Arrow Motor Co. at Buffalo to the salesman making the best showing during the week. Papin sold passenger cars with a list price of \$31,400 during one week. He sold five cars, two runabouts and three closed cars.

The Marathon Motor Car Co., Ford and Lincoln dealer at Wausau, Wis., recently moved into a new building where it has 40,000 sq. ft. of floor space with accommodation for more than 200 cars. Occupancy of the new building was celebrated with a house warming to which everybody in Marathon County and surrounding territory was invited.

McCamey Motor Company has succeeded McFarland Robinson Company as Ford dealer at Portland, Oregon. T. C. McCamey is president of the company and Roy Clark is secretary. They operated a Ford agency at Bridgeport, Neb., for several years. They expect to occupy a new building in Portland about December 10th.

The Hudson-Roberts Motor Co., with W. S. Roberts as president, was authorized as a Hudson and Essex dealer in St. Louis and St. Louis County last week by the Hudson-Frampton Motor Car Co., St. Louis Hudson distributor. The new company has opened sales and service quarters on Meramec avenue, Clayton, Mo. Roberts recently sold his interest in the West Side Buick Auto Co., which he established in 1920.

An efficiency banquet to its employees was given last week by the Mendenhall Motor Co., St. Louis Ford and Lincoln dealer, at the Statler Hotel. About 115 persons attended.

Edwin E. Emons has purchased the controlling interests in Houck & Emons, Buffalo, N. Y., Nash distributor.

The following new Chandler dealers have been appointed: S. J. McMurray, Oxnard, Calif.; Golden Red Garage, Akron, Colo.; Sawin Garage, Columbus, Ind.; Citizens Auto Co., Crawfordsville, Ind.; Ossie Eades, Franklin, Ind.; J. M. Phillips, Seymour, Ind.; E. A. Talbert, Shively, Ind.; Edgar B. Sloan, Kirksville, Mo.; A. R. Riep, Ely, Nevada; McRorie-Sautter Motor Car Co., Utica, N. Y.; Woodward Auto Sales Co., Lima, O.; C. A. Woodard, Van Wert, O., and the Hill Top Garage, Bella Vernon, Pa.

The Union Auto Sales Co. has been appointed distributor for Haynes cars at Fort Wayne, Ind., and adjoining counties. The territory includes the city of Fort Wayne and the counties of Allen, Whitley, Noble, DeKalb, Steuben, Wabash, Huntington, Wells, Adams and Blackford.

Frank and Paul Lundquist, who recently opened a new garage at 1512 Seventh street, Rockford, Ill., have secured the Winnebago county rights for the Buick cars, selling direct from the factory as independent dealers. The firm is also carrying an extensive line of accessories.

The Homeville-Reo Co. has been chartered at Toledo, O., with an authorized capital of \$10,000 to buy, sell and deal in automobiles, parts and accessories.

Forty Chevrolet distributors from Central Illinois assembled on October 26 at Galesburg to discuss the trade outlook for winter and arrange a plan of campaigning for business. Reports from all sections were received, and all were of an optimistic nature, largely due to the high price of corn, which is regarded as the most favorable development of the year and one calculated to be of the greatest value to the automobile industry.

Daniel Bickel, automobile accessory dealer of Galesburg, Ill., with shop at 240 East Simmons street, has decided to retire from business. He disposed of his stock at public auction.

Herbert Bros., distributors in the Philadelphia

The Locomobile Co. of Pennsylvania, Inc., distributor of Locomobiles in Philadelphia, held a formal opening of its new quarters at 1411-1415 Spring Garden street. The building also will house the new Princeton Six now in course of production at the plant of the Locomobile Co. of America, in Bridgeport, Conn.

territory for Chandler and Cleveland cars, whose main offices and salesrooms are at 1409-11 North Broad street, have opened supplementary salesrooms at 231-33 North Broad street, with Charles D. Hunter as manager.

Contract for the construction of a modern garage building at 452 East McDaniel avenue, Springfield, Mo., has been awarded to G. M. Henschel. The building is estimated to cost \$10,000.

The Peerless Motor Car Co. of Cleveland, has announced that a factory branch for handling the business in the southern territory will be established in Atlanta early in the coming year. The factory recently announced the appointment of Julian H. Lifsey, who has been identified with the industry in Atlanta for a number of years, as southern district representative with headquarters in Atlanta, in charge of sales in six adjacent southern states.

The Harth Auto Co. of Knoxville, Tenn., distributor in the East Tennessee territory for the Dort, Haynes and Winton Six, announce the appointment, effective November 1, of Fred Ford, of that city, as general sales manager.

The Stewart Tire Co. has been reorganized at Springfield, Ill., and capital stock increased to \$10,000. Phillip Stewart, president and founder, has taken into partnership U. L. Schavo, for 12 years in the life insurance business, and F. H. Grant, who has been salesman for the Goodyear Tire & Rubber Co. in the Illinois territory for the past five years. The plant is at 228 South Peoria street.

The Elmwood Park Garage Co. has been organized at Elmwood Park, Ill., the promoters being Emil Mack and Adolph Trost. Capital stock has been fixed at \$25,000.

Jesse O'Neal and Cellus Jose recently purchased the Hudson and Essex agency for Jefferson City, Mo.

Everett Luckett, who has been associated with the Motor Sales Co. at Moscow, Mo., since its beginning in October, 1922, has sold his interest to his partner, Owen Anderson.

Ben Hollingshead and C. E. Mills have purchased from J. A. Calhoun, the City Garage on Washington avenue, West Plains, Mo.

L. H. Billings has purchased the Clinton, Mo., Ford agency from the Carter-Moore Automobile firm and will operate it under the name of The Billings Motor Co.

A large service station is to be constructed at North Knoxville, Tenn., by the White Truck Co. branch, according to an announcement last week by W. G. Stephenson, Knoxville branch manager. The building will occupy a site 100x140 feet, and will be finished by February 1, 1924.

W. C. Hicks and Coley Westbrook of Montezuma, Ga., have purchased the Buick franchise for that district from Herbert and Emmett McKenzie, who have been Buick dealers at Montezuma for some years. Westbrook is in charge of the business.

The Rhino Tire Co., 420 Peachtree street, is a new organization in the automotive equipment field in Atlanta, distributing the Cupples cord tires and tubes in the Atlanta territory. W. Anderson is in charge as manager.

The following have been appointed as new Nash dealers: Electric Truck Service, Inc., Boston, Mass.; A. R. True, Amesbury, Mass.; Fred Ott, South Haven, Mich.; Silka Automobile Co., Minneapolis, Minn.; L. F. Lewis, Batesville, Miss.; Homer E. Hall, Sedalia, Mo.; Harding Motor Co., Humboldt, Neb.; Brier Bros., Inc., Far Rockaway, N. Y.; A. F. Janacek Motor Sales Co., Lynbrook, L. I., New York; Dorsma Garage Corp., Millerton, N. Y.; J. & N. Motor Co., Fayetteville, N. C.; Smith Bros., Lenoir, N. C., and the Hunter Motor Service Co., E. Cleveland, O.

Among new Nash dealers are the following: A. W. Younger Co., Girard, O.; Lansford Garage, Lansford, Pa.; Tioga Automobile Co., Philadelphia, Pa.; Central Garage, Dillsburg, Pa.; Bailey Bros. Garage, Dermont, Pa.; H. S. McCollins, Ford City, Pa.; Armor Motor Co., Gettysburg, Pa.; Moss Bros. Garage, Pawtucket, R. I.; Breeden Automobile & Supply Co., Bennettsville, S. C.; S. E. Mercer, Georgetown, S. C.; Ragland Motor Co., Lubbock, Tex.; Pike Norwood Motor Co., Austin, Tex.; Cross Bros. Co., Northfield, Vt.; Nash Motors Sales Co., Coalton, W. Va.; Powells Nash Co., Walworth, Wis.; Sagle Garage Co., Platteville, Wis.; Geo. T.

Hearne Has Clear Lead of 412 Points Over Rival Murphy

Jimmy Can Retain Championship by Winning Thanksgiving Classic

NEW YORK, Nov. 5.—Revision of the championship standing by the Contest Board of the American Automobile Association gives Eddie Hearne a clear lead of 412 points over his closest rival, Jimmy Murphy, present holder of the title. This closeness makes the final race of the season, the Thanksgiving Day meet at Los Angeles, the deciding one, for if Murphy wins then and Hearne fails to finish in the money, Murphy will retain the championship.

Hearne holds the lead with a total of 1622 points, scoring in each of the seven championship events already contested, whereas Murphy's 1210 were accumulated in four, two of which he won, Los Angeles and Fresno. Hearne also has won twice, at Kansas City and Altoona. Murphy's trip to Europe forced him to pass up his chance at both Altoona and at Fresno last month.

The standing in the point table to date is as follows: Hearne, 1622; Murphy, 1210; Hartz, 820; Milton, 810; Fengler, 670; Hill, 455; Wonderlich, 391; Cooper, 310; Elliott, 251; Lewis, 234; De Palma, 155; Comer, 110; Corum, 90; De Cystria, 35; Durant, 34; Morton, 33; Duray, 25; K. Sailer, 25; Thomas, 20; M. Sailer, 15; Resta, 13; Melcher, 10; Haibe, 9; Shafer, 7.

Stehling's Garage, Milwaukee, Wis.; Ziehlke Bros. Co., Medford, Wis.; Forest Junction Auto Service, Forest Junction, Wis.; Nash Garage, Berlin, Wis.; E. A. Weinke, Portage, Wis., and A. J. Orr (Standard Garage), Orillia, Ontario, Canada.

The Pleasant Valley Automobile Co., for many years Packard dealer in Wheeling, W. Va., has added the Maxwell-Chalmers line. H. A. Rider has been appointed sales manager for the Maxwell-Chalmers line and Carl Sneider is now plant manager in charge of the new plant of the firm.

Employes of the Wilson-Nash Motor Co., Baltimore, have organized a social club known as "Another Nash Club of Baltimore," to promote the feeling of friendliness. Spencer Honig, the sales manager, has been elected president; Lawton Brown, service manager, vice-president; J. C. Beatty, assistant manager, treasurer, and S. Plowman, shop foreman, secretary.

After purchasing the Moyer Ford agency in West Main street, Springfield, O., John W. Thompson, formerly of Baltimore, entertained the 25 employes at dinner at Hotel Bancroft. He announced the following personnel: Office manager, A. C. Byers; parts department manager, Max Wells; service manager, H. W. Farmer.

James H. Giles, president of the Plainfield City Garage, Plainfield, N. J., has opened commodious salesrooms at 127-137 East Second street for the sales of the Peerless line.

The Mayer Motor Co. of Greenwich, Conn., has been appointed agent for Greenwich and Stamford for the Peerless and is opening salesrooms in both cities.

Among new Chandler dealers are the following: Huffs Garage, Santa Barbara, Calif.; C. H. Boyd, Worthington, Ind.; Long Motor Co., Iowa Falls, Ia.; H. V. Rouse, Lexington, Ky.; C. S. Jackson, Monroe City, Mo.; J. A. Brown, Mt. Airy, N. C.; Roth & Gordon, Lewisburg, Pa., and the Raudenbush Service Garage, Selinsgrove, Pa.

The READERS' CLEARINGHOUSE

Questions & Answers on Dealers' Problems

Resistance Wanted to Control Motor Speed

Q—We intend making a test stand for generators and motors and wish to know if there is a simple way to make a speed regulating device for a $\frac{1}{4}$ h.p. D.C. 110 volt motor.

1—The resistance you use depends somewhat on the kind of motor you have. If it is a series wound motor you need a comparatively low resistance in series with the whole machine. If it is a shunt wound motor, which is most likely, you can use resistance in series with the armature circuit only. It would probably be best however, if you would get some sort of a speed regulating rheostat or combination starting rheostat and regulating rheostat. Name of concern making such devices will be given by letter.

2—Would a lamp bank to cut in resistance be practicable to slow it down?

2—Unless you have a large number of lamps the resistance will probably be too high. However, this is easy to try if you care to do so.

Using Stewart Speedometer for a Tachometer

3—We would like to use a Stewart Speedometer which we have here as a speed indicator. How can we figure the correct sprocket so as to make the indicator read 10 revolutions instead of one mile? It is a Ford speedometer of the old dash type.

3—If you had it read 10 revolutions per each mile per hour it would read up to a total of 6000 r.p.m. which is higher than you need to go. When the shaft runs 1000 r.p.m. the speedometer is supposed to read 60 m.p.h. It would probably be well to run the shaft 1-3 as fast as your generator drive using a pinion three times as big as the one on the generator drive shaft. This will enable you to record a speed of 3027 r.p.m. when the indicator says 60 m.p.h. Instead of changing the dial it will be accurate enough if you consider that the 10 m.p.h. point then means 500 r.p.m., the 20 m.p.h. point 1000 r.p.m. and so on.

4—Could a constant potential charging outfit for one or two batteries be made by connecting a Bijur constant voltage regulator to a Ford generator?—Ivo V. Pennington, Wauneta, Nebr.

4—A constant potential generator must meet two requirements. In the first place it must be able to hold the voltage constant while in the second place it must be able to give out a very heavy current at that voltage. For example, in charging one 6 volt battery from a constant potential machine it might draw as much as 60 or 70 amperes at first. Inside of half an hour it would probably drop off to 18 or 20 amperes and when

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

like to run engine as slow as possible to get that power.—Atlantic & Pacific Garage, Logan, N. M.

Judging from data supplied by reference to the power torque and fuel consumption curves of the Dodge engine 700 r.p.m. would be the ideal speed to deliver 10 to 15 h.p.

2—How much fuel would this engine use per h.p. hour? Could it be made to run on kerosene?

2—at 700 r.p.m. the engine will require about $\frac{3}{4}$ lbs. per h.p. hour, or, written decimals, .75 lbs. We would not advise the use of kerosene with this engine because of the fact that it is built for light and medium duty and kerosene fuel is not exactly suited to it.

BEARING FIT NECESSARY TO ELIMINATE OIL LEAK

Q—What is the practical way to stop the oil leaking out of the rear main bearing on an Oakland model 34B? Sometime ago I removed the crankcase, took up the main bearings and connecting rod, but have not been able to stop this leak. It does not leak much until the engine gets well warmed up, then it takes about one gallon of oil for every 10 miles. Since first taking up this bearing I have twice removed the crankcase and each time installed new gaskets and new felt packing around the bearing, and it still continues to leak.—E. W. Young, Wilmot, Kansas.

The first and most probable cause is that the bearing does not have perfect surface contact with the crankshaft. Regardless of how many felt washers you install and how many gaskets are put in the bearing they will not retain the oil unless the surface of the upper and lower bushing has about 80 to 90 per cent contact on the crankshaft. Being a pressure lubrication system the oil will follow out of the bearing at any point where the bushing does not touch the crankshaft journal and any operations on the bearing other than giving good contact will avail you nothing.

Another possibility is that the oil is leaking past the shims, between the cap and the upper part of the bearing. Renewal of the shims is about the only thing that can be done to eliminate the oil should it be caused from this source. Our recommendation however, is to remove the crankshaft and fit both the upper and lower half using great care in reaming or scraping so that you get at least 85 per cent bearing contact. When this is done and the shims are carefully installed and felt placed you will have eliminated the oil leak entirely. So be sure that the old return hole that drains the oil back to the case is open.

practically charged the current would be down to 1 or 2 amperes.

The difficulty comes in the fact that the windings of the Ford generator armature are incapable of giving out as much current as that, the limit probably being 18 or 20 amperes, and at this rate the generator would overheat inside of an hour. Therefore as the generator does not have enough current capacity for the purpose there is no use worrying about the application of the regulator.

A Ford generator however, may be used for charging one battery at the rate of 12 amperes or 2 batteries in parallel at the rate of 6 amperes each or a total of 12 amperes.

AUTOMOBILE ENGINE FOR STATIONARY POWER PURPOSES

Q—We are contemplating the use of a Dodge motor car engine for stationary purpose, requiring something like 10 h.p. Will it be practical, and at what speed would it be best to run the engine to get that amount of power? We would

In Which the Architect Saves the Chestnuts

Q—We have just purchased a piece of property 70x120 ft. and we are planning on building a two-story building.

We want to build this within 18 in. of the sidewalk line and we will have to put a driveway, for two cars to pass, on one side of the building. Sales department, parts department, offices, wash rack, quick service bench, elevator and a used car department to hold about six cars, to be on the first floor; second floor to be used entirely for service department.

Attached you will find a small sketch of the layout of our building, but we are at a loss to figure out just where we could place the different departments on the first floor, so that we can utilize every bit of space.—Wilkes-Barre Buick Co., Wilkes-Barre, Pa.

A—We have been obliged to change your layout to a considerable extent on account of the fact that you have so badly misjudged the proportions that hardly anything you suggested will work out. Instead of placing the used car showroom back of the regular showroom, we have arranged it at the rear of the building where it will get plenty of light and have considerable more room than it could possibly have where you have indicated it.

We have moved the parts department to the second floor so that it will be handy to the shop. In order to make it accessible to outside parts customers, we have arranged a little room up at the head of the stairway, so that customers seeking parts will not be obliged to go through the shop and in any way interfere with operations.

The elevator is in a very convenient location and there is space for the storage of nine cars in the garage. There would be room in the garage for a quick service room but we are inclined to believe that it would be easier to send such jobs directly to the second floor, rather than try to do them in dark places and the garage is bound to be rather dark, as there are no windows of any kind.

The space on the second floor directly in front of the elevator, which we suggested as a trim or battery department, might very well be used for this quick service in case the other departments are not wanted.

If you desire more space on the second floor there is no reason why you cannot extend this second floor out over the entrance, placing a couple of columns along the lot line, although this, of course, will darken the showroom and offices.

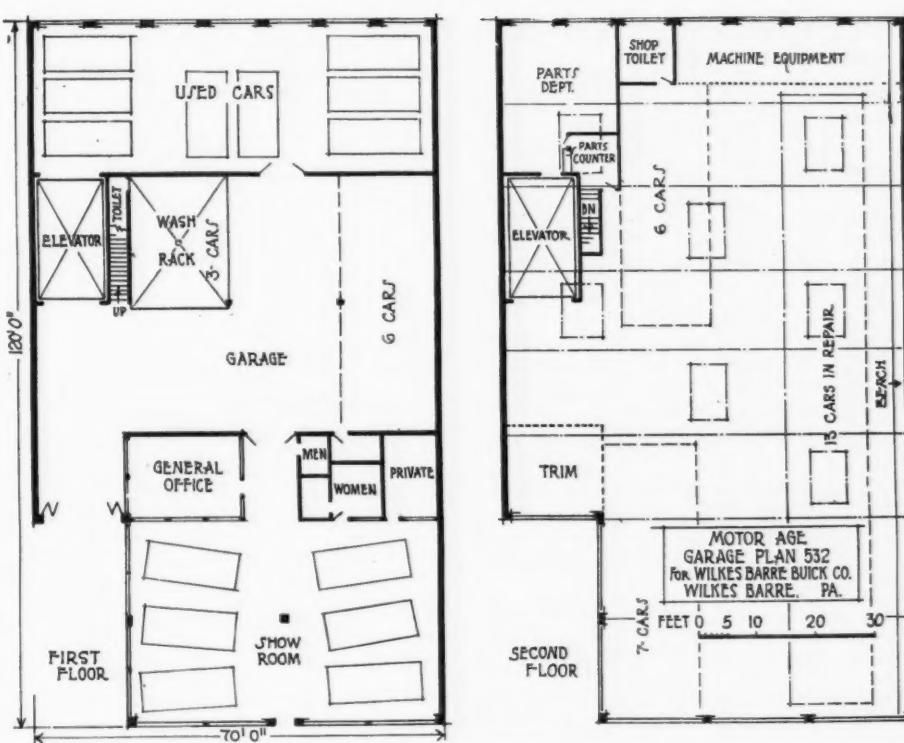
ENGINE MAKER MAY HAVE POWER CURVE

Q—What is the maximum r.p.m. and h.p. developed by the engine in the Saxon Duplex car?

This information is not available and we would advise that you communicate with the Gray Motor Corp., Detroit, Mich., manufacturers of the engine in the Saxon Duplex car.

2—Where can I obtain one of these engines and parts for same?

2—Either from the Saxon Motor Car Co., Ypsilanti, Mich., or from the manufacturers mentioned in the answer to the first question.



Architectural Service

In giving architectural advice, MOTOR AGE claims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected to be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.

3—Could one of these engines be rebuilt and installed in a lightweight chassis for dirt track racing?

3—Yes.

4—Please give some idea of how to rebuild this engine for racing.

4—We do not possess specifications for this engine and, therefore, suggest that you take up the proposition with the manufacturer.

5—What is the advantage of using 28x4 wheels for racing?

5—Perhaps the greatest advantage of the 28x4 wheels as used on dirt track is the added strength. Generally speaking, the larger the diameter of wheel the greater will be the leverage on the axle shaft and on the hub. Reducing the diameter means this is decreased and in addition with the type of wheels now being used it is possible to run with the tire blown or punctured without danger of it flying off of the rim.

6—About what h.p. and r.p.m. does the Fronty Ford 183 cu. in. racing car develop?—George R. Clark, Nashville, Tenn.

6—The h.p. varies between 60 and 70 at about 3300 to 3400 r.p.m.

FROM 60 TO 90 M.P.H. PERHAPS

Q—We contemplate increasing the speed of a Stutz 4, model G roadster, which will run only 60 m.p.h. The pistons are cast iron with Inland piston rings, and we are anxious to receive any suggestions you may offer. We would like to increase the speed to 90 m.p.h.—Alfonso Enriquez, Paco Service Station, Manila.

We doubt if it would be feasible to change this engine to get the speed indicated, although you can no doubt increase the speed considerably.

About the easiest thing to do is to replace the cast iron pistons with aluminum alloy pistons of the constant clearance type. These should be fitted in accordance with the manufacturer's recommendation and should be fitted with concentric piston rings.

You may also increase the speed somewhat by putting in valves which are $\frac{1}{8}$ in. greater in diameter, providing an inspection of the valve cap shows that a larger valve could be put in. The cylinder head is not detachable on this car so this feature should be carefully checked before trying to use larger valves.

Some increase in speed may be obtained by smoothing up the valve ports with a portable emery wheel of small diameter operated on a flexible shaft. You can not only smooth up the ports but enlarge them somewhat, and if you care to make up a special manifold $\frac{1}{4}$ in. larger you could also use a larger carburetor. If you care to go to the expense you might also get a special camshaft made up.

After you have obtained the maximum possible power from the engine you might then experiment with various gear ratios in the rear axle, but the engine should be worked on first.

Lubrication of Hudson Clutch

Q—Supply information as to how to oil clutch on Hudson super six 1917 model J.

1—There are two places to oil the Hudson clutch. First is to have a certain amount of lubricant in the clutch housing and second is to properly lubricate the clutch throwout. The housing lubricant is put in by removing the clutch housing cover, which is accessible by removing the floorboard. Never put more than half a pint of mixture in at one time and always drain the used oil before filling in with fresh oil. Use half kerosene and half good motor oil.

Reference to the illustration shows the tube that runs from the floorboard to the clutch throwout collar which has a grease cup at its outer end. Make sure that this tube has no leaks in it and that it is properly connected to throwout collar housing.

2—How do you set Stewart-Warner speedometer back to zero without taking it apart?—The Central Garage, Kerrobert, Sask., Canada.

2—This job is best accomplished by sending the speedometer to the nearest authorized Stewart Service Station. It is not recommended that you attempt the resetting yourself as it involves the use of special tools.

10 AMPERES MAXIMUM CHARGING CURRENT. WHAT'S WRONG?

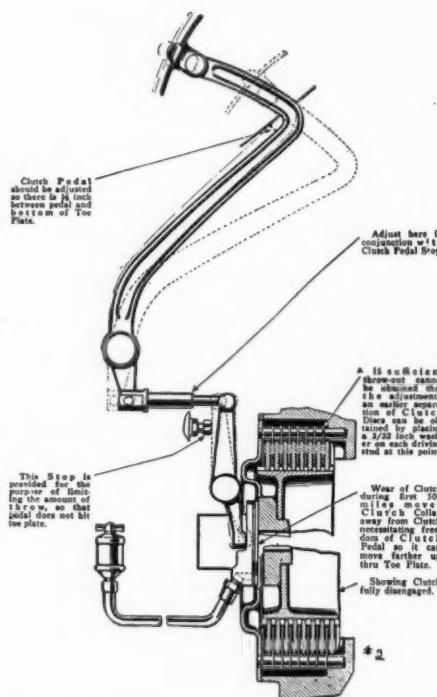
Q—Advise why a Remy generator on an Oakland B 34 will not charge more than 10 amperes with the third brush moved all the way in the direction of rotation. The owner states that the generator never charged any higher. When the interrupter contacts are closed it draws 18 amperes and when allowed to turn it motors all right. With the third brush lifted and battery current applied to the main brushes it motors slowly in the right direction.

As an experiment we marked the main brush holders and then moved them slightly, first one way and then the other, with no better results. When the thermostat points open it only charges 6 amperes. Advise how to disassemble this generator.

1—The only way to do is to make a thorough test on this machine as, from the symptoms described, we cannot say offhand that the trouble is in any particular part of the generator. You will have to use your own discretion in taking the machine apart, but there are two or three general principles in doing this.

It is usually well to hold the brushes up off the commutator if possible and also to disconnect from the brushes any field leads which run in toward the frame of the machine. You will then find screws on the end bracket which hold it to the frame. These can be removed and the end bracket will then come off readily. If in doubt as to how it should go on again it would be well to scratch both the end bracket and the frame so as to get it on in the same position.

When removing the end bracket do so carefully to make sure that you have disconnected all wires that need to be disconnected. We would suggest testing



the brush holders for grounds with 110 volt line and you should find one main brush holder grounded, but the third brush holder and the other main brush holder should not be grounded. You should also test the fields for ground and also test the armature for ground.

The armature can then be tested for short circuits by using a growler, and the commutator should be inspected to see if one side of the armature is open. If two opposite commutator bars appear black and burnt it would indicate an open circuit in the armature.

The field winding on this machine should draw from 4 to 5 amperes on 6 volts, and you might test the coils separately to see that they draw the same current.

In a generator having two poles, each field coil will draw twice as much as the normal field current, while in a four pole machine each coil will draw four times as much as the normal total field current. If you do not find any abnormal condition, would suggest, if possible, trying another similar armature, as it is possible that the one you have is incorrectly wound or has wire which is too small, and if on completing these tests you have not run down the trouble, would suggest your advising us of the results so that we may give additional information.

2—We also have a Westinghouse generator on a Darr car which will not charge more than 10 amperes, although the customer states that it would charge up to 18 amperes before it was sent to the factory for new bearings.—John L. Nelson, Symerton, Ill.

2—Westinghouse generators on Darr cars were of two types. One had third brush regulation, and the instructions given for the Remy generator in question No. 1 will apply to this Westinghouse generator. The other type machine used

an external voltage regulator and it is possible that the adjustment of this needs to be changed. It is taken care of by a screw, which is turned to the right, or clockwise, in order to increase the tension on the contacts and cause the generator to give out more current.

CUTTERS FOR TIMING CHAIN SPROCKETS

Q—Recently we found it necessary to make a sprocket for a Detroit generator starter used on a model 14 Saxon. The blank was made from steel, but we could find no cutter suitable for milling the teeth. As an emergency makeshift we used a No. 4, 9-pitch cutter, and with very little filing at the point of the teeth the result was a quiet and satisfactory sprocket. Advise where we can get proper cutters for this work, and also advise names of concerns making replacement chains.—Thomas Llewellyn, Llewellyn's Shop, Okmulgee, Okla.

We do not know that there is any concern specializing in replacement chains, as these differ somewhat. The original concerns, however, which have made the chain used on a car you may be working on can always supply new chains for the job. They also usually make a point of supplying cutters as well as chains, so that a shop figuring on doing much of this business can lay in a supply of chain and suitable cutters as well. Names of concerns making silent chains will be given by separate letter.

ENGINE POWER CURVE HELPFUL IN SELECTING PROPER GEARING

Q—Can you furnish power curve of Haynes light 12 cylinder motor and Durant four? What is the maximum r.p.m. of each?

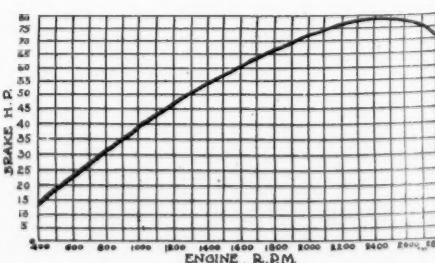
1—Power curve of the Durant is not available. The Haynes 12 cylinder power curve is shown.

2—How much speed do you think I could get out of the Haynes if it was put in a good chassis?

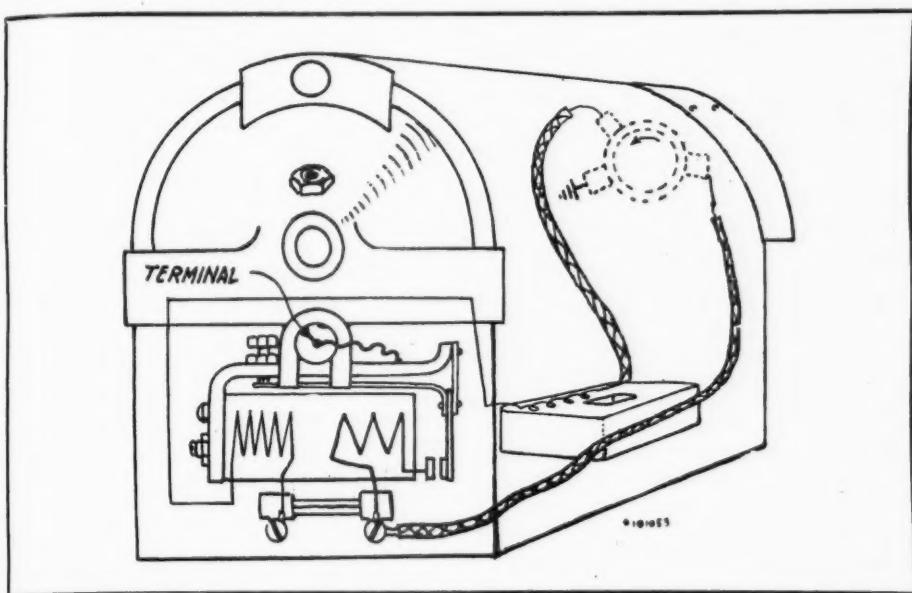
2—This is a difficult question to answer accurately, but under average conditions you should be able to secure 1 m.p.h. for every h.p. of the engine.

3—I have a Maxwell racer that will make 65 m.p.h. How much more speed should I get with a Durant motor?—Lynn Eldredge, Evart Garage, Evart, Michigan.

3—The amount of speed that will be secured is dependent on the power developed by the engine. If the Durant engine develops more power than the Maxwell with the same weight it will, if properly geared, give more speed. For further information regarding the characteristics of the Durant four engine we would advise that you communicate direct with the factory.



Internal Circuits of Eisemann Magneto Generator



Q—Publish an internal wiring diagram of an Eisemann magneto generator type M 4 G 6.—W. J. Young, Rosedale, Kansas.

Diagram is shown in accordance with your request. The cutout and field fuse are located at the end of the generator opposite the commutator. The field coil appears to have four leads coming from it due to the fact that a connection from the live main brush to the cutout is taped in with the field coil. Current from this main brush goes through the field fuse and through the fine winding of the cutout and through the shunt field winding back to the third brush. It will therefore be seen that the shunt winding

of the cutout and shunt field itself are in series and are in the same circuit.

When the cutout points close, current from the live brush goes through the series winding and across the contacts to the terminal which is connected to battery. Adjustment of the cutout is controlled by the screw and lock nut shown at the left of the terminal. A two ampere fuse is correct for the field fuse.

The diagram given shows the upper portion of the machine only which is the generator part. The magneto portion which is below the generator is of conventional construction except that the magnet lies on its side.

BALANCED PARTS ESSENTIAL FOR HIGH SPEED

Q—While waiting for your information, I gave the Ford engine a thorough test with the band on the flywheel I drove it about 700 miles through the country. I found out that it does not pull at all on a hill and could only get 27 m.p.h. from it on the level. I also found out that the motor overheats very quickly.

I have new pistons and rings in it and they fit well. The valves have been ground, but the engine has a lot of vibration to it, although it will throttle down very well.

Do you think the trouble is due to the 8 lb. ring that I put on the flywheel in place of the magnets? When the magnets were removed, I replaced them with 6 metal dips on the flywheel, to take care of the oiling and the lubrication seems to be O. K.—Walter T. Edward, Dayton, Ohio.

In taking off the magnets on this Ford car and replacing them with a steel ring, you have probably disturbed the balance of the crankshaft, assuming that it was balanced to start with.

We believe that if you have the engine down again it would be well to take the crankshaft, flywheel and transmission and support this assembly on knife edges using one at the front main bearing, one at the center main bearing, one at the rear main bearing and one at the rear transmission bearing. Set these knife edges absolutely horizontal and set the

transmission and crankshaft assembly on them. Then see if the assembly tends to rotate so that any particular point on the flywheel is down. If so, it shows that the flywheel is out of balance. You will then have to drill holes in it at suitable points until it will set in any position you put it and does not show any tendency to rotate until a certain part is down.

This work is all necessary to eliminate vibration and make it possible to get fairly high speed without shaking the car to pieces. It is also desirable to have the pistons all the same weight and the upper and lower end of the connecting rods all the same weight.

The trouble due to lack of speed, poor pulling and overheating appears to us to be in the timing of the spark. You have installed a new ignition system, according to a previous letter, and it is quite likely that you have not got it advanced enough. Would suggest your changing the timing a little bit at a time and trying to crank it with the lever in the retard position, using great care to pull up on the crank only. Keep advancing the spark until the crank kicks back and then retard it slightly until you get a point where you can just pull up on the crank and have the engine fire and rotate

in the normal direction. This is an experimental method and should only be done if you are quite sure you can pull up on a crank and allow it to kick back without having it strike you.

A more conservative method is to set the timing so that, when the piston comes up on compression stroke and is just at top center position, that the interrupter points open at the same instant. This can be checked by the ammeter reading which should have been about 5 amperes discharge with the points together and should just drop back to zero when the piston gets to the dead center position.

If you have had the engine apart so that the timing gears have been out of mesh, it might also be well to see that the exhaust valve closes when the piston has come up on dead center and then gone down about 1/64 inch.

LANCIA ENGINE WITH STAGGERED CYLINDERS

Q—We would like some information on the Lancia eight-cylinder engine with cylinders set at a slight angle and all cast in the same block. Would also like to have a mechanical diagram of this engine showing valve action, timing, bore and stroke, and any information you can give. Would like key or scale for figuring timing gear ratio and would also like to have ignition timing.—J. D. Terry, McGehee, Ark.

We have been unable to locate description of eight-cylinder Lancia but did find a description of the four-cylinder engine. The location of the cylinders is similar to an ordinary four-cylinder engine except that alternate cylinders have been set slightly to one side so that the engine block could be made shorter. The action is somewhat similar to taking four tin cans, standing them in a row and then trying to reduce the length of space they occupy. They would push closer together but would push to one side at the same time.

For gear ratio and timing you can probably depend on fundamental principles which will not vary to any extent in this engine. For example, the ignition in the retard position will have to take place on or very slightly after top dead center and you can consider any cylinder in setting the ignition. In the same manner you can figure that the valve action will have to occur at $\frac{1}{2}$ engine speed which is fundamental with a four-cycle engine no matter what the peculiarities of its design. For this reason the cam-shaft gear would require twice as many teeth as the crankshaft gear.

For more specific information would refer you to the New York Lancia dealer, Lancia & Co., 25 W. 57th street, New York City.

THE MYSTERY

of Curves is no mystery at all. Engineering for the Service Man, this week offers you a simple explanation of making, reading and applying torque and power curves.

The Supercharger for High Speed Engines

Q—Supply a general sketch of the principle of supercharger illustrated with a sketch if possible. The amount of pressure put through carburetor and general means of making it.

1—A sketch showing installation of the supercharger in the Mercedes racing car was printed in MOTOR AGE on page 21 of the June 7, 1923 issue. This description of the Mercedes supercharger will also enable you to understand the principles of super-charging.

2—Who makes a hub cap shaped as per drawing submitted. Made of brass and strong enough that a jack can be put under it. We got some in a left over stock, and have inquiries for more. They are to fit Fords.

2—This will be answered by letter.

3—Explain meaning of compression ratio.

3—The meaning of compression ratio and a method of its determination was printed in the July 5, 1923, issue of MOTOR AGE on page 43.

4—What compression ratio would you

advise for a car for fast road work in all weather and on bad roads, also what rear axle ratio. The Speeder light weight body.

4—The best compression ratio depends on so many factors that we would be unable to answer your question in the Reader's Clearing House columns. Generally speaking from a standpoint of fuel efficiency only, the higher the compression the greater will be the fuel economy. In other words the higher the compression the greater will be the h.p. for the same size engine, and having the same weight, greater mileage will be secured.

The rear axle ratio is dependent on the characteristics of the engine and the torque and maximum h.p. and if you wish us to give you a definite answer we will be forced to ask for a definite example. The compression ratio that is correct for one engine may be entirely unsuitable for another engine, so if you want further information it will be necessary to be more specific in your question.

5—How can compression ratio be determined on an engine in practice?—M. Ekman, Winnipeg, Man., Canada.

5—This can be determined by referring

to the issue mentioned in answer to your third question.

Flat Rates for the Electrical Shop

Q—We are operating a battery and electrical service station only and are very much interested in developing flat rates for this type of business. We already have flat rates in operation in the Battery Department and have had for some time, but are not in position to develop flat rates for electrical repairs. If you have any data on this would be glad to hear from you.—Barbey Battery Service, Reading, Pa.

Some time ago we published a table giving the flat rates on a number of cars, as far as the electrical units were concerned. These prices were compiled from two or three sources and in some cases changed somewhat. As there should be considerable interest in this subject we are publishing them again. In some localities of course it may be found that some variation from these prices will be necessary possibly due to competition or some other business condition.

{ SUGGESTED FLAT RATE BASIS FOR THE ELECTRICAL SHOP }																			
SYSTEM AND CAR	GENERATORS					STARTING MOTORS					MISCELLANEOUS								
	OFF AND ON FINAL TEST ON CAR	RETIME IGNITION	REPAIRING AND BENCH TEST	EXTRA FOR SOLDERING COMMUTATOR	EXTRA FOR TURNING AND UNDERCUTTING COM.	EXTRA FOR PUTTING IN FIELD COILS	ADJUST CHARGING RATE ON CAR ONLY	OFF AND ON IVC. BENDIX, REMOVAL	BENDIX ONLY OFF AND ON	REPAIR STARTER	EXTRA FOR SOLDERING COMMUTATOR	EXTRA FOR TURNING COMMUTATOR	EXTRA FOR PUTTING IN FIELD COILS	TEST ONLY ON CAR (NO OTHER WORK DONE)	ADJUST CHAIN	INSTALL CHAIN ONLY	REMOVE CLUTCH	PUT NEW PARTS IN CLUTCH	REPLACING COMMUTATOR END BRACKET CASTING ONLY
FORD	1.00	—	2.50	1.00	1.00	1.00	.75	3.00	1.25	50	2.00	1.00	.50	1.00	.75	—	—	—	—
DODGE 1917-22 NORTH EAST MODEL G	2.00	—	3.50	1.00	1.00	2.50	.75	—	—	—	—	—	—	—	.75	1.00	1.50	—	—
DODGE 1916 NORTH EAST MODEL D	3.00	—	5.00	1.00	1.00	3.00	—	—	—	—	—	—	—	—	.75	1.00	1.50	—	2.00
CHEVROLET 1916-22 AUTOLITE	1.00	1.00	2.50	1.00	1.00	1.00	.75	1.50	—	.50	2.00	1.00	.50	1.00	.75	—	—	—	—
EARL AUTOLITE	1.00	1.00	2.50	1.00	1.00	1.00	.75	1.50	—	.50	2.00	1.00	.50	1.00	.75	—	—	—	—
BUICK 1917-1922 DELCO MOTOR GENERATOR	250	1.00	3.75	1.50	1.50	1.00	.75	—	—	—	—	—	—	—	.75	—	—	3.00	.75
HAYNES MODEL 55 LEECE NEVILLE	1.00	1.00	3.00	1.00	1.00	1.00	.75	1.50	—	.50	2.00	1.00	.50	1.00	.75	—	—	—	—
CADILLAC 59-1920-21 DELCO #162 MOTOR GEN.	2.50	—	4.00	1.50	1.50	1.00	1.00	—	—	—	—	—	—	—	.75	—	—	3.00	.75
CADILLAC 61 1922 DELCO #98 MOTOR GEN.	3.50	—	4.50	1.50	1.50	1.00	1.00	—	—	—	—	—	—	—	.75	—	—	4.00	.75
JORDAN F AND MX DELCO	1.50	—	2.50	1.00	1.00	1.00	.75	1.00	—	.50	2.00	1.00	.50	1.00	.75	—	—	—	—
NASH 1917-19-22	1.50	—	2.50	1.00	1.00	1.00	.75	1.00	—	.50	2.00	1.00	.50	1.00	.75	—	—	—	—
STUDEBAKER 1920-22 REMY & WAGNER	1.50	—	2.50	1.00	1.00	1.00	.75	1.75	—	—	2.50	1.00	.50	1.00	.75	—	—	—	—
REO 1920-21 N.E. MODEL (L) GEN.	1.00	—	2.50	1.00	1.00	1.00	.75	1.75	—	—	2.50	1.00	.50	1.00	.75	—	1.50	—	—
REO N.E. MODEL L.R. WITH IGN.	1.00	1.00	3.00	1.00	1.00	1.00	.75	1.75	—	—	2.50	1.00	.50	1.00	.75	—	1.50	—	—
MAXWELL 1920-21-22 JIMM'S HUFF AUTOLITE	1.00	—	2.50	1.00	1.00	1.00	.75	1.00	—	.50	2.00	1.00	.50	1.00	.75	—	—	—	—
CHALMERS 1918-22 WESTINGHOUSE AUTOLITE	2.50	1.00	2.75	1.00	1.00	1.00	.75	1.00	—	.50	2.00	1.00	.50	1.00	.75	—	—	—	—
HUDSON 1917-22 DELCO MOTOR GEN.	2.50	—	3.25	1.00	1.00	1.00	.75	—	—	—	—	—	—	—	.75	—	—	3.00	.75

Too Many Pigtails May Ground the Third Brush

Q—Our service car, a model H-45 Buick, 1919, has been giving a great deal of trouble for some time with the Delco starter-generator. We have taken it to several electric service stations, none of which seemed to be able to diagnose the case. It first began to heat the tension springs on the bottom starter and generator brushes. This was remedied by pig-tailing these brushes to the carrier plates. When this is done the starter works well, but the generator will not charge.

By removing the plate and the two attached brushes, the generator will charge up as high as 20 amperes, but upon replacing the brushes it again refuses to function. What is the answer?—Valley Exide Battery Co., Lawrenceville, Ill.

It is probable that, when pig-tailing the brushes, the third brush was also pig-tailed. Referring to the illustration, you will note that the third brush is insulated by having a piece of non-conducting material fitted onto the brush arm between its pivot point and the commutator. Having the normal ground brush, which is carried on the side plate, and the starter brush grounded, and the third brush used for regulation grounded, gives the effect of a shorted armature and no current is produced.

However, when you remove the side

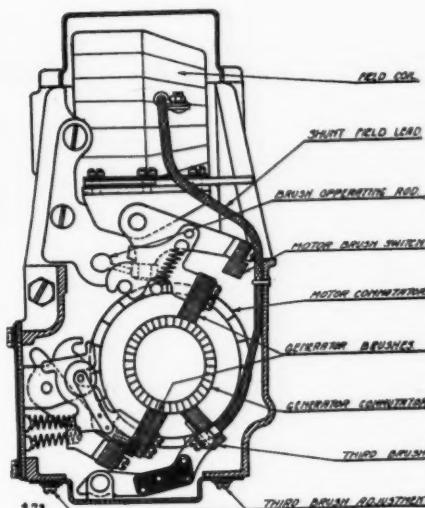


plate that carries the starter brush with the normal generator ground brush the generator operates as a shunt wound machine because of the fact that the location of the third brush, which now is acting as a normal ground brush, allows the machine to produce current. The remedy of course, is to remove the pig-tail or search for a ground on the third brush plate making sure that this brush is entirely insulated.

past upper dead center position, turn the camshaft so that the cam operating the exhaust valve has just allowed the exhaust valve to close. If the gears will mesh in his position, it is properly timed.

This data is given because of the fact that through years of comparing valve timing diagrams on the various engines we find that none of them vary more than 10 degs. on the exhaust closing position and we are assuming that the exhaust valve closes between 8 and 15 degs. after upper dead center. The ignition timing is the same as used on any conventional engine, that is with the spark set at top dead center firing stroke with the control in full retard position.

POWER CURVE OF CHEVROLET

Q—Publish the power curve of the Chevrolet 490 and the Haynes model 37, also the weight of each motor and car complete.

The power curve and the weight of the Haynes 37 engine are not available. Power curve of the Chevrolet 490 engine is shown. The weight of the Chevrolet touring model complete is 1,810 pounds. The engine weight is not known.

2—I would like to have the address of a company that makes brass spring wire, also specialties of this material.

2—This will be given you by special letter.

Negative Plate May Discharge Locally If Changed Over to Positive

3—Would it be practical to assemble all negative plates together to make a battery, as a battery station always has a large number of second-hand negative plates in good condition. If not practicable, explain why.—Jules L. Sottiaux, Lovington, Ill.

3—Theoretically it is possible to

change negative plates over to positive and use them in conjunction with other negative plates. There are, however, a number of obstacles in the way of making a successful battery.

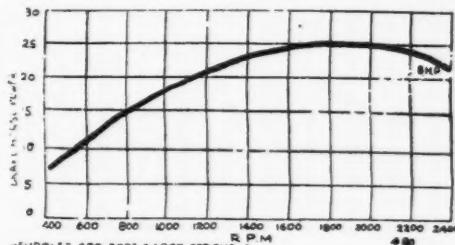
In the better type of batteries the red lead and litharge used in pasting the negative plates also have lamp black mixed in to act as an expander. Negative plates without the lamp black tend to harden when not in use so that it is then difficult to make the current flow through them. The lamp black has the action of maintaining the plate in a porous condition so that chemical action takes place easily.

The average battery which has been reversed, so that the positive is changed to negative has the bad feature that the active material does not last very long. There is usually a tendency to have the active material loosen up from the grid and fall off. This action is more pronounced on the positive plate but even so would be likely on the negative plates to a certain extent. This action moreover is most pronounced when the plates are somewhat sulphated at the time the reversal takes place.

If a battery were discharged from a fully charged condition and immediately charged in the reverse direction so that it was not allowed to stand for any length of time in a discharged condition the plates would reverse with fair degree of success. The average negative plate however, is probably somewhat sulphated.

It is possible of course to reverse the negative and if this is done it should be done at first experimentally using plain lead plates or dummy plates as negatives and using the regular negative plates as positives or as plates to be changed over to positives. After a set of negatives have thus been rebuilt into positive plates a battery could be made up with them in the regular way.

The most practical way to use up old negative plates is to buy positives to go with them and build up batteries to be used either as rental batteries or to be sold as rebuilt batteries to customers unwilling to pay the price of a new one.



YOUR ATTENTION

is called to the concluding installment of "What the Maintenance Man Should Know About Four Wheel Brakes. Page 17.

BOOSTING ACCESSORY SALES

**“YOUR Satisfaction Guaranteed—
Money Cheerfully Refunded.”**

A big white card, the width of one of Chicago's cut rate accessory and tire shops, bears these words and it looks good up there. The other day, however, a man who had bought a stop light in this place, came in with it and said, "Say, I can't put this thing on my car—I want my money back." And he went on and explained the whole situation to the frowning clerk, told how he had followed the directions, exactly as printed in the folder, and for his pains was shocked twice, broke his pliers, cussed freely and finally did something which left his car without lights altogether.

The clerk looked at the light and knew, when he was looking at it that he didn't know any more about it than the customer did. He was trying hard to think of an alibi, and after about fifteen minutes of explaining and quibbling with the man, said, "Why don't you take it to a garage?" This was the last straw. Having lost patience, the customer walked out, leaving everything behind.

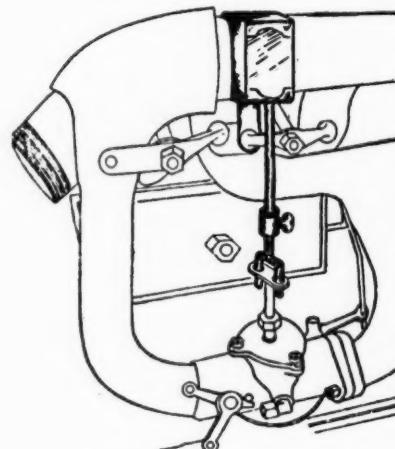
Car owners are rapidly learning their lesson from these places and are always on the lookout for the place that will GIVE, not guarantee satisfaction. And they'll pay more for it too. When you sell an accessory, sell everything that goes with it and that includes satisfaction more than anything else. Car owners know the difficulty they usually experience in putting on things themselves and most of them can easily be sold on letting you do the work for the difference in your price and the cut rate merchant's. Don't fall an opportunity to drive home this fact to your customers—sell them on the idea that the difference is so small that they cannot afford to take a chance with the cut rate "put-it-on-yourself" dealer.

The Biflex License Plate Holder is designed for attachment to Biflex and similar type bumpers. It places the license plate in a position visible to all and is so made as to stay rigid. It sells at \$1.25 and is made by the Biflex Products Co., Waukegan, Ill.

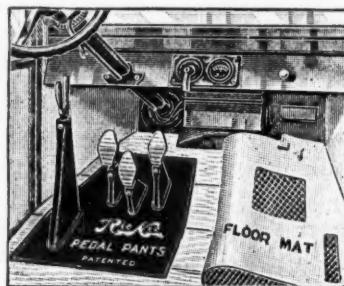
A cut is reproduced on this page of the Irving Florman Company's motor meter and radiator ornament. Several different ornaments are offered which can be fitted to the top of any size motor meter by removing the four upper screws in the motor meter frame, placing the bracket which is part of the ornament on top of the meter and replacing the screws back into the motor meter.

The Metal Stamping Company of Long Island City is featuring the new Lyon parallel bar bumper with an end-fold.

This new resilient bumper is rugged yet built in graceful lines. The continuous ends form a solid one-piece barrier with double resistance under impact. The end fold gives strength at the ends—where it is most needed.



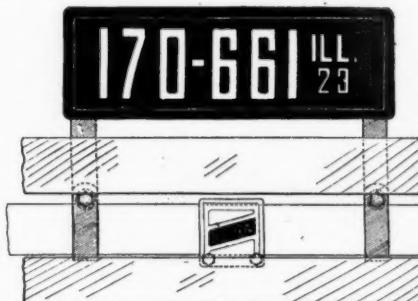
Blancke thermostatic control



Rie Nie pedal pants



Florman radiator ornament



Biflex license plate holder

The bumper is made in 1 1/4 in. and 2 in. widths of the same steel, specially heat treated and oil tempered for resiliency and affords broad-faced bumping protection across the entire front of the car. An improved type back shackle bolt fitting makes possible easy and rigid attachment to all cars.

The Buffalo Forge Co., 490 Broadway, Buffalo, N. Y., has announced two new models of visor, one of which is especially designed for low and medium priced cars. These visors are made entirely of 22 gage rust resisting sheet metal. One model, the "B," is made without aluminum fittings and trimmings. The price of the Model "A," for open cars, is \$7.50.

A. C. Blancke & Co. has brought out a thermostatic carburetor control for Fords. The attachment is clamped against the Ford exhaust manifold and carries a coil of thermostatic metal attached to the end of a rod whose other extremity terminates in a fork, engaging with the Ford needle valve adjustment.

The device is so designed that increasing temperature in the Ford manifold causes the action of the thermostatic coil to rotate the rod carrying the fork, consequently reducing or increasing the proportion of gasoline as the temperature rises and falls. The attachment is so regulated as to record a movement of .0001 in. for each half degree change in temperature.

The attachment proportions the density of the mixture in accordance with the temperature of the motor, and takes compensating adjustment. It retails for \$5.00.

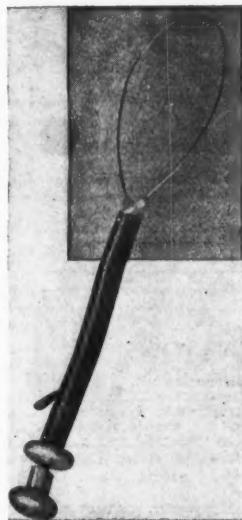
Rie Nie Pedal Pants assure the Ford driver of comfort and protection from cold winds. This rubber protector is placed under the floor mat and has sleeves which fit snugly around the pedals and emergency brake, shutting out the wintry winds and drafts that whistle up through the openings. The flexibility of Pedal Pants permits the easy operation of brakes and pedal and does not in any way impede driving.

Rie Nie Pedal Pants are manufactured by Durkee-Atwood Company of Minneapolis, Minn., manufacturers of the well-known Rie Nie line.

The Columbus McKinnon Chain Company of Columbus, O., manufacturers of Dreadnaught Tire Chains, announces the production of its new Double Duty Tire Chain. The main feature is that there is a cross chain for every other link of rim chain, thus allowing three cross chains to be always on the ground.

The manufacturers state that this new Double Duty Chain is of entirely new construction. The chain itself is heavier, there are an increased number of cross chains and a new and improved fastener. It also provides for smoother riding, particularly on closed and heavy cars.

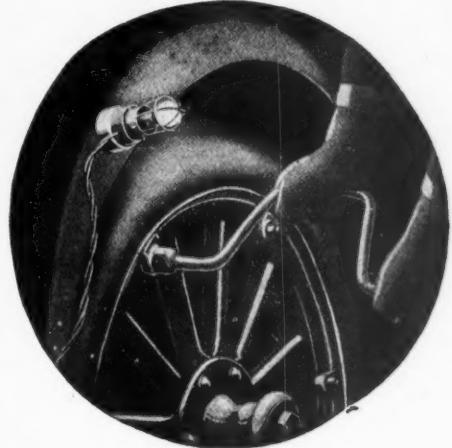
GETTING MORE OUT of the SHOP



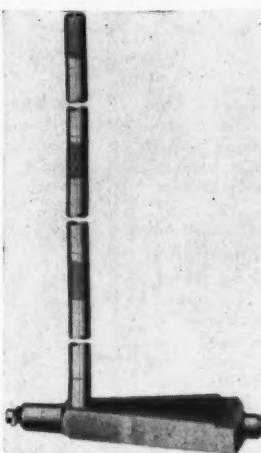
Colwell piston ring compressor



Peoria garage light



Magnet light



Cylinderite



Smith rim adjuster



Manley towing pole

WHEN your customers have occasion to go into your shop, what impression do they carry out with them? Do they look about them with an air of satisfaction, as if that look had convinced them that in that shop, their car would get the best treatment? You cannot hope to have a customer carry off such an impression if you do not at all times keep that shop, clean, light and airy. If the men working there look dirty and disgusted, the first thing the customer thinks of, is, "I'll bet those poor fellows are sick and tired of this job. They can't possibly do good work when their minds are not on it."

And when a lady customer comes in—then is when your shop gets the severest

criticism—she will tell her husband things that he didn't have time to pick out and she will tell her friends. If she is courteously received in a well ventilated, clean and well-lighted shop, she will carry that message to every one she knows—much quicker and with better results than a man will.

The Manley Mfg. Co., York, Pa., has brought out the Manley Towing Pole, illustrated on this page. This towing pole was especially designed to guard against damage to the car being towed when a turn is made or an unevenness in the road met with. The pole is easily attached to the axle of any car and the universal joints make for safety in towing the load.

The Colwell Machine Works, Norfolk, Nebr., has brought out a one hand piston ring compressor, a cut of which is shown on this page.

The Grove Mfg. Co., Dayton, O., announces the Cylinderite, a gage designed to measure the cylinder to the fraction of a thousandth of an inch. By applying the instrument to the top of the cylinder and bringing it to zero by turning the adjusting screw, then moving the top of the handle slowly backward and forward, it will be noticed that the hand will come up to zero and retard. By turning it around or moving it down into the cylinder, each time giving the handle this slight adjustment, the gage will center itself and give at a glance, the amount of taper or the amount the cylinder is out of round.

The Cylinderite is made of aluminum, all bearings being bushed. The contact points are hardened steel, and the adjusting screw is hardened and works in a hardened spring bushing. The price is \$6.50.

The Magnet Light, the product of the Trova Motor Products Co., 2504 Cass avenue, St. Louis, Mo., is a lamp designed for use either by the mechanic or the car owner himself. As the cut illustrates, it has a magnet grip which makes it possible to attach it to any metal. It is equipped with socket for attachment to any electric light and sells for \$3.50, complete.

Lighting in the shop presents a problem for many dealers that is not easily overcome. It is one subject which always comes in for much discussion at any dealers' or service men's meeting. Usually, it is pretty hard to depend upon daylight as dark days are inevitable and if good work is to be done, good light must be a part of that work.

The Peoria Overhead Washer Co., Peoria, Ill., recently announced the Peoria Garage Light, a cut of which is reproduced on this page. This light is so designed as to provide light at any angle for work on an automobile. It can be used for close-up work, as shown in the cut, or it can be used for general lighting when washing a car or performing some similar operation where light is needed on every part of the car at once. It is adjustable to any position desired. It sells at \$20.

The Smith Rim Adjuster is the product of O. F. Smith, Moline, Ill., and is designed for use in the shop and in the tool kit of the car. By laying the tire flat, unfastening the lock joint and placing the hook over the edge of the rim about three inches from the joint and inserting the outer hook over the rim, directly opposite, then inserting the handle in disk and revolving to right until rim is drawn in sufficiently so that the casing is drawn from the rim, the operation is completed in a short time. The same method is used when replacing the tire.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Albuquerque, N. M.	U. S. Good Roads Assn. and Show	May 26-31
Atlanta	Southern Automobile Show	Feb. 16-24
Baltimore	Annual Automobile Show	Jan. 19-26
Boston, Mass.	Annual Automobile Show	March 8-15
Brooklyn, N. Y.	Annual Automobile Show	Jan. 19-26
Chicago	National Automobile Show	Jan. 26-Feb. 2
Chicago	Good Roads Show	Jan. 14-31
Chicago	Annual Salon, Drake Hotel	Jan. 26-Feb. 2
Cincinnati	Third Annual Accessory and Radio Show	Nov. 17-24
Cincinnati	Eighteenth Annual Automobile Show	February
Cleveland	Annual Automobile Show	Jan. 19-26
Dallas, Texas	Annual Automobile Show	Feb. 11-17
Danbury, Conn.	Automobile Show in Conjunction with	
Des Moines	Annual Automobile Show	Feb. 25-March 1
Detroit, Mich.	Annual Automobile Show	Jan. 19-26
Kansas City, Mo.	Annual Automobile Show	Feb. 9-16
Los Angeles	Automobile Show	Nov. 10-18
Louisville, Ky.	Automobile Show at the Jefferson County Armory	Feb. 18-23
New York	Foreign Automotive Association Exposition	Nov. 4-10
New York	Annual Salon, Hotel Commodore	Nov. 11-17
New York	National Automobile Show	Jan. 5-12

Philadelphia	Annual Automobile Show	Jan. 12-19
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San Francisco	Pacific Automobile Show	Feb. 16-23
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Syracuse, N. Y.	Automobile Show	Feb. 25-March 1
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Washington, D. C.	Annual Fall Automobile Show	Oct. 28-31
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FOREIGN SHOWS

Buenos Aires	Annual Automobile Exposition	Nov. 1-15
London	Motor Car Exposition	Nov. 2-10

RACES

Berkeley, Calif.		Thanksgiving
Los Angeles		Nov. 25
Oakland, Calif.		Nov. 1

CONVENTIONS

Chicago	Exhibit and Convention of Automotive Equipment Association	Nov. 12-17
Columbus, O.	Annual Convention, Ohio Trade Assn.	Dec. 5-6
Des Moines	Iowa Automotive Merchants Assn.	Nov. 8-9
Detroit	S. A. E. Annual Meeting	Jan. 22-23
New York	National Tire Dealers' Assn. Convention	Nov. 13-15
Washington, D. C.	National Motorists Association	Nov. 16-17

SQUEEKS & RATTLES

"Kay Em" Roberts Writes an Ad

The Yarham Brake Service Station, 1443 Locust St., Des Moines, takes this novel way of calling the attention of a multitude of neglectful autoists to their daily peril, in driving about without an exact knowledge of the condition of their brakes. Most anybody might profit by the lesson which "Hiram Green" learned, just a trifle late for his own good.

"Old Hiram Green sped down the street in his new tin machine, he sat, elated, in the seat and burned good gasoline. Unto himself he thought, 'I'm smart to drive this rattling steed,' he almost shook the thing apart with crowding on the speed. He whizzed about, all wreathed in smiles and had a barrel of fun, he got her up to forty miles—as fast as she would run. Then 'round a corner, to his right, another fliv bore down—old Hiram shoved his foot down, tight, but still his wheels spun 'round. And to his most profound dismay he found he had no brake, although he'd bought the car that day and figured it was jake. No further details will be read—they can as well be guessed—except that Hiram Green is dead and brake-wise—like the rest."

"Don't take chances. We will make your brakes function efficiently. 'Our brake inspection is your protection,' is the way the ad is concluded.

Help! Help!

Walt and Frank Write a Letter

And, here is a letter which Muller Bros., Hollywood, sent to the proprietor of a theatre which was showing the film, "The Covered Wagon"—it was an open letter in their house organ, "The Air Hose":

Mr. Sid Grauman,
Egyptian Theatre,
Hollywood, Calif.

Dear Sir:

Now that your "Covered Wagon" has run smoothly for six months, don't you think it's about ready for a thorough oiling and greasing? Let us lubricate it and it ought to run for six years.

Of course you know that we oil, wash and polish the best "covered wagons" in Hollywood. Some are covered with mud, some with mortgages and others with strange and suspicious markings. Anyway, if you want the "Covered Wagon" to keep running, bring it in.

Servicely yours,
"The World's Greatest Service Station."
By Walt and Frank.

Help! Help!

More About the Wagon

The surprising thing about the film, "The Covered Wagon," is that the promoters were able to dig up that many wagons.

—Detroit Motor News.

Help! Help!

SEVEN LITTLE EDITORS

Seven little editors
Typing with loud clicks,
One described the Packard Four—
Then there were six.

Six little editors
For new ideas astive,
One wrote: "Grease the inner tube"—
Then there were five.

Five little editors
Full of motor lore,
One suggested sand for gears—
Then there were four.

Four little editors
One wrote carelessly:
"Kerosene good lubricant"—
Then there were three.

Three little editors
Telling what to do,
"Leave the choke pulled out," said one—
Now there are two.

Two little editors,
One thought 'twould be fun
To ball up wiring diagrams—
Then there was one.

One little editor
After all these battles
Made the paper sell lykelle
Writing Squeeks and Rattles.

—Mike Rometer.

Help! Help!

THERE'S AN END to everything—even to squeaks and rattles
—when the proper lubrication is used, therefore—

LEW BRICATION.

Current Motor Truck Specifications

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	ENGINE			REAR AXLE		TIRES		MAKE AND MODEL	Tons Capacity	ENGINE			REAR AXLE		TIRES					
		Make & Model	Bore & Stroke ^a	Clutch Make	Gearset Make	Make & Model	Final Drive	Front			Make & Model	Bore & Stroke ^a	Clutch Make	Gearset Make	Make & Model	Final Drive	Front	Rear			
Acme. 20 9-1	Co-N.	3 1/2 x 5	B&B. Cot.	Ti-6250.	WO.	34x5n	34x5n	Duplex. G 1	Bu-WTU	3 1/2 x 5 1/2	B-L.	Ti-5511.	SB.	33x5	33x5n						
Acme. 30 1-1 1/2	Co-N.	3 1/2 x 5	B&B. Cot.	Ti-6352.	WO.	34x3 1/2	34x5	Duplex. GH 1 1/2	Bu-WTU	3 1/2 x 5 1/2	Cov.	Sh-1501.	WO.	35x5	36x6						
Acme. 40 1 1/2 -	Co-J4.	3 1/2 x 5	B&B. Cot.	Ti-6460.	WO.	34x3 1/2	34x5	Duplex. A 2	\$2775	Hi-400.	4x5 1/2	Cov.	Sh-103.	WO.	35x5n	33x7n					
Acme. 60 2 1/2 - 3	Co-K4.	4 1/2 x 5 1/4	B&B. Cot.	Ti-6560.	WO.	36x4	36x7	Duplex. AC 2 1/2 - 3	Hi-400.	4x5 1/2	B-L.	Vu-4.	WO.	34x5	36x8						
Acme. 90 3 1/2 - 4	Co-L4.	4 1/2 x 5 1/2	B&B. Cot.	Ti-6660.	WO.	36x5	40x10	Duplex. E 3 1/2	3500	Bu.	4x5 1/2	B-L.	Own.	IG.	36x8	36x8					
Acme. 125 5 - 6 1/2	Co-B5.	4 1/2 x 6	B&B. Cot.	Ti-6760.	WO.	36x6	40x12	F. W. D. B 3	4200	Wi-A.	4 1/2 x 5 1/2	H-S. Cot.	Own.	SP.	36x6	36x6					
Amer. La France 3 1/2	Own.	4 1/2 x 6	Own.	Own.	WO.	36x5	36x5	Fageol. 1 1/2	3000	Wa-CT.	3 1/2 x 5 1/2	B-L.	Own.	Ti-6461.	WO.	34x3 1/2	34x6				
Amer. La France 5	5500	4 1/2 x 6	Own.	Own.	WO.	36x6	40x6	Fageol. 2 1/2	3900	Wa-CU.	4 1/2 x 5 1/2	B-L.	Own.	Ti-6560.	WO.	34x4 1/2	36x7				
Armedleder. 21 1/2 -	Bu-GTU	3 1/2 x 5 1/2	Ful.	Ti-8460.	WO.	31x3 1/2	34x6	Fageol. 4	5000	Wa-DU.	4 1/2 x 6	B-L.	Own.	Ti-6666.	WO.	36x5	36x5d				
Armedleder. HWB 2 1/2 -	Bu-HTU	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560.	WO.	36x4	Fageol. 6	5700	Wa-DU.	4 1/2 x 6	B-L.	Own.	Ti-6760.	WO.	36x6	40x6d				
Armedleder. HWC 3 1/2 -	Co-C4.	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560.	WO.	36x4	Federal. R 21	Co-J4.	3 1/2 x 5	B&B. Det.	Ti-6250.	WO.	33x5n	33x5n						
Armedleder. KWB 3 1/2 -	Bu-YTU	4 1/2 x 6	B-L.	B-L.	Ti-6666.	WO.	36x5	Federal. S 21 - 22	Co-J4.	3 1/2 x 5 1/2	B&B. Own.	Ti-6252.	WO.	34x5n	36x6n						
Armedleder. KWC 3 1/2 -	Co-E4.	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6666.	WO.	36x5	Federal. U 2 1/2	Co-K4.	4 1/2 x 5 1/2	B&B. Det.	Ti-6560.	WO.	36x4	36x8						
Attibury. 20R 1 1/2 - 2	Co-J4.	3 1/2 x 5	Ful.	Ti-8460.	WO.	34x4	34x6	Federal. W 2 3/4 - 4	Co-L4.	4 1/2 x 5 1/2	B&B. War.	Ti-6666.	WO.	36x5	40x5d						
Attibury. 22C 2 1/2 - 3	3375b. Co-K4	4 1/2 x 5 1/4	B-L.	B-L.	Ti-6560.	WO.	36x4	Federal. X 2 5/6	Co-B5.	4 1/2 x 6	B&B. War.	Ti-6760.	WO.	36x6	40x6d						
Attibury. 22D 3 1/2 - 4	4275b. Co-L4.	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6660.	WO.	36x5	Ford. TT 1	370	Own.	3 1/2 x 4	Own. Own.	WO.	30x3 1/2	32x4 1/2						
Attibury. 8E 5 - 6	4975b. Co-B2.	4 1/2 x 6	B-L.	B-L.	Ti-6760.	WO.	36x6	Front Drive. 1 1/2	2800	Bu-CTU.	3 1/2 x 5 1/2	B&B. Own.	WO.	36x5	36x4						
Autocar. 21 1 1/2 - 2	2200	Own.	4 1/2 x 4 1/2	Own.	Own.	DR.	31x4	31x6	G.M.C. K 16 1	1295	Own.	3 1/2 x 5 1/2	Own. Own.	SB.	34x5n	34x5n					
Autocar. 27 2 1/2	3100	Own.	4 1/2 x 5 1/2	Own.	Own.	DR.	31x5	36x8	G.M.C. K 41 2	2375	Own.	4 1/2 x 5 1/2	Own. Own.	Ti-6560.	WO.	36x4	36x7				
Autocar. 26 1 1/2 - 6	4200	Own.	4 1/2 x 5 1/2	Own.	Own.	DR.	31x6	36x12	G.M.C. K 41 2	2450	Own.	4 1/2 x 5 1/2	Own. Own.	Ti-6560.	WO.	36x4	36x8				
Available. JH 1 1/2 -	2450	He-O.	4 1/2 x 5 1/2	B-L.	Ti-6460.	WO.	36x3 1/2	36x5	G.M.C. K 71 3 1/2	3600	Own.	4 1/2 x 6	Own. Own.	Ti-6666.	WO.	36x5	40x5d				
Available. H 2 1/2 -	3160	He-CU3.	4 1/2 x 5 1/2	B-L.	Ti-6560.	WO.	36x4	36x12	G.M.C. K 71 3 1/2	3700	Own.	4 1/2 x 6	Own. Own.	Ti-6666.	WO.	36x5	40x12				
Available. H 3 1/2 -	4175	He-MU3	4 1/2 x 5 1/2	B-L.	Ti-6666.	WO.	36x5	40x6d	G.M.C. K 101 5	3950	Own.	4 1/2 x 6	Own. Own.	Ti-6760.	WO.	36x5	40x6d				
Available. H 5	5375	He-T3.	5x6	B-L.	Ti-6760.	WO.	36x6	40x12	G.M.C. K 101 5	4050	Own.	4 1/2 x 6	Own. Own.	Ti-6760.	WO.	36x5	40x14				
Avery. 1 1/2 - 1/4	Own.	3x4	Own.	Own.	To-OX2.	IG.	31x5	34x5n	Gary. F 1	1775	Bu-WU.	3 1/2 x 5 1/2	Ful. Ful.	Ti-6352.	WO.	36x3 1/2	36x5				
Bessemer. G 1	1450	Co-N.	3 1/2 x 5	Ful.	Ful.	To-A.	IG.	35x5n	35x5n	Gary. F 2	12450	Bu-GTU.	4 1/2 x 5 1/2	Ful. Ful.	Ti-6460.	WO.	36x3 1/2	36x7			
Bessemer. H 2 1/2 -	1995	Co-N.	3 1/2 x 5	B&B.	B&B.	Bk-L.	LM-7150	DR.	36x3 1/2	36x5	Gary. F 3	2850	Bu-GTU.	4 1/2 x 5 1/2	Ful. Ful.	Ti-6560.	WO.	36x4	36x8		
Bessemer. J 2 1/2 -	2895	Co-C2.	4 1/2 x 5 1/4	B&B.	B&B.	Bk-L.	LM-7250	DR.	36x4	36x4d	Gary. F 4	3250	Bu-HTU.	4 1/2 x 5 1/2	Ful. Ful.	Ti-6560.	WO.	36x4	36x8		
Bessemer. K 2 1/2 -	3495	Co-E7.	4 1/2 x 5 1/2	B&B.	B&B.	Bk-L.	To-E.	IG.	36x5	36x10	Gary. F 5	4200	Bu-HTU.	4 1/2 x 6	Ful. Ful.	Ti-6666.	WO.	36x5	36x10d		
Bethlehem. KN 1	1385	Own.	3 1/2 x 5	B-L.	B-L.	Bk-Det.	Ea-100.	SB.	35x5n	35x5n	Gary. F 6	5000	Bu-BTU.	5x6 1/2	Ful. Ful.	Ti-6760.	WO.	36x6	40x6d		
Bethlehem. GN 2	2185	Own.	4 1/2 x 5	B-L.	B-L.	Bk-Det.	Wi-60A.	DR.	34x4	34x6	Gary. F 7	5750	Bu-BTU.	5x6 1/2	Ful. Ful.	Ti-6760.	WO.	36x6	40x7d		
Bethlehem. HN 3	2985	Own.	4 1/2 x 6	B-L.	B-L.	Bk-Det.	Wi-88A.	DR.	36x4	36x8	Gary. F 8	1775	Bu-WU.	3 1/2 x 5 1/2	Ful. Ful.	Ti-6352.	WO.	36x3 1/2	36x5		
Brockway. E 2 1/2 -	Wi-SU.	4x5	B-L.	B-L.	Co-52001.	SB.	33x5n	33x5n	Gary. F 9	12450	Bu-GTU.	4 1/2 x 5 1/2	Ful. Ful.	Ti-6460.	WO.	36x3 1/2	36x7				
Brockway. S 1 1/2 -	Wi-SU.	4x5	B-L.	B-L.	Ti-6460.	WO.	36x4	36x6	Gary. F 10	2850	Bu-GTU.	4 1/2 x 5 1/2	Ful. Ful.	Ti-6560.	WO.	36x4	36x8				
Brockway. K 2 1/2 -	Co-K4.	4 1/2 x 5 1/4	B-L.	B-L.	Ti-6560.	WO.	36x4	36x8	Gary. F 11	3250	Bu-HTU.	4 1/2 x 5 1/2	Ful. Ful.	Ti-6560.	WO.	36x4	36x8				
Brockway. R 3 1/2 -	Co-L4.	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6666.	WO.	36x5	36x5d	Gary. F 12	4200	Bu-HTU.	4 1/2 x 6	Ful. Ful.	Ti-6666.	WO.	36x5	36x10				
Brockway. T 5	5	Co-B5.	4 1/2 x 6	B-L.	Ti-6760.	WO.	36x6	40x6d	Gary. F 13	4450	Bu-BTU.	5x6 1/2	Ful. Ful.	Ti-6760.	WO.	36x6	40x12				
Buick. 23-4-SD 3 1/2 -	945	Own.	3 1/2 x 4	Own.	Own.	SB.	31x4	31x4n	Graham Bros. BD 1	1285	Do.	3 1/2 x 4	Dod. Dod.	Own.	SD.	33x4 1/2	34x5n				
Case. TR 2	Own.	4 1/2 x 5 1/4	TD.	TD.	Own.	To-C139.	IG.	36x6n	38x7n	Graham Bros. CE 1 1/2	1235	Do.	3 1/2 x 4	Dod. Dod.	Own.	SB.	33x4 1/2	34x6n			
Chevrolet. Sup. 1/2	395	Own.	3 1/2 x 4	SB.	Own.	Own.	SB.	30x3 1/2	30x3 1/2	Graham-Pion. 10 1	1245	Ly.	3 1/2 x 5	B&B. B-L.	Sa-1483.	SB.	33x5n	33x5n			
Chevrolet. Util. 1/2	550	Own.	3 1/2 x 4	SB.	Own.	Mun.	SB.	31x3 1/2	31x3 1/2	Graham-Pion. 15 1	1750	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5			
Clinton. (See Schwartz)										Graham-Pion. 15 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5			
Clydesdale. 10 1/2	2350	Co-N.	3 1/2 x 5	B&B.	B&B.	Ti-5511.	SB.	34x5n	34x5n	Graham-Pion. 16 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5			
Clydesdale. 8 2 1/2	2650	Co-K4.	4 1/2 x 5 1/4	B-L.	B-L.	Ti-6460.	WO.	36x4	36x7	Graham-Pion. 17 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5			
Clydesdale. 6 3 1/2	3300	Co-L4.	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560.	WO.	36x5	36x5d	Graham-Pion. 18 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5			
Clydesdale. 45 6	4200	Co-B5.	4 1/2 x 6	B-L.	B-L.	Ti-6666.	WO.	36x6	40x6d	Graham-Pion. 19 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5			
Clydesdale. 20 6 - 7	4500	Co-N.	3 1/2 x 5	Det.	Det.	Sa-D10.	SB.	32x4 1/2	32x4 1/2	Graham-Pion. 20 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5			
Commerce. 9 1/2 - 1 1/4	Co-N.	3 1/2 x 5	Det.	Det.	Ti-6666.	SB.	34x5n	34x5n	Graham-Pion. 21 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5				
Commerce. 14 1/2 -	Co-N.	3 1/2 x 5	Det.	Det.	Ti-6666.	SB.	34x5n	34x5n	Graham-Pion. 22 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5				
Commerce. 25 2 1/2 -	Co-K4.	4 1/2 x 5 1/4	B-L.	B-L.	Ti-6560.	WO.	36x4	36x8	Graham-Pion. 23 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5				
Corbit. S 3 1/2	HS-700.	3 1/2 x 5	B-L.	B-L.	Ti-6666.	WO.	36x4	36x8	Graham-Pion. 24 1	2250	Ly.	3 1/2 x 5	B&B. B-L.	Ti-6460.	WO.	36x3 1/2	36x5				
Corbit. E 1	Co-N.	3 1/2 x 5	B																		

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	TONS CAPACITY	PRICE	ENGINE		REAR AXLE	TIRES		MAKE AND MODEL	TONS CAPACITY	ENGINE		REAR AXLE	TIRES									
			MAKE & MODEL	BORE & STROKE		CLUTCH MAKE	GEARSET MAKE			MAKE & MODEL	BORE & STROKE		CLUTCH MAKE	GEARSET MAKE								
Maccar.	L2 1 1/2		Co-K4.	4 1/2 x 5 1/4	B-L.	B-L.	Ti-8460.	WO.	36x4	36x6	Selden.	50B 2 1/2	4 1/2 x 5 1/4	B-L.	Ti.	WO.	36x4k	36x7k				
Maccar.	HA 2		Co-K4.	4 1/2 x 5 1/4	B-L.	B-L.	Ti-6560.	WO.	36x4	36x4d	Selden.	53B 3 1/2	4 1/2 x 5 1/4	B-L.	Ti.	WO.	36x4k	36x7k				
Maccar.	H2 3		Co-L4.	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560.	WO.	36x4	36x5d	Selden.	70B 3 1/2	4 1/2 x 5 1/2	B-L.	Ti.	WO.	36x5k	36x10k				
Maccar.	M3 4		Co-L4.	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6666.	WO.	36x5	36x6d	Selden.	73	4 1/2 x 6	B-L.	Ti.	WO.	36x5k	36x10k				
Maccar.	G 5-6		Co-B2.	4 1/2 x 6	B-L.	B-L.	Ti-6760.	WO.	36x6	40x6d	Selden.	90A 5	4 1/2 x 6	Del.	B-L.	Ti.	WO.	36x6k	40x12			
MacDonald.	O 3-5	\$5500b	Bu-WTU	3 3/4 x 5 1/2	B-L.	B-L.	**Own.	IG.	36x6	36x10	Service.	12	3 1/2 x 4 1/2	Hoo.	Det.	Ti-5311.	SB.	32x4 1/2	32x4 1/2			
MacDonald.	A 7 1/2	8000b	Bu-YTU	4 1/2 x 6	B-L.	B-L.	**Own.	IG.	40x7	40x14	Service.	25	1 1/2	Bu-WTU	3 3/4 x 5 1/2	B-L.	Eu-1000.	SB.	34x5n	34x5n		
Mack.	AB 1 1/2	3000	Own.	4x5	Own.	Own.	Ch.	36x4	36x3 1/2d	Service.	33	1 1/2	Bu-GBU	4 1/2 x 5 1/2	B-L.	Ti-6352.	WO.	34x3 1/2	34x6			
Mack.	AB 1 1/2	3450	Own.	4x5	Own.	Own.	DR.	36x4	36x3 1/2d	Service.	42	2	Bu-EBU	4 1/2 x 5 1/2	B-L.	Ti-6460.	WO.	36x4	36x7			
Mack.	AB 2	3300	Own.	4 1/2 x 5	Own.	Own.	Ch.	36x5	36x4d	Service.	61	3	Bu-EBU	4 1/2 x 5 1/2	B-L.	Ti-6560.	WO.	36x4	36x8			
Mack.	AB 2	3750	Own.	4 1/2 x 5	Own.	Own.	DR.	36x4	36x4d	Service.	81	4	Bu-EBU	4 1/2 x 5 1/2	B-L.	Ti-6666.	WO.	36x5	36x10			
Mack.	AB 2 1/2	3400	Own.	4 1/2 x 5	Own.	Own.	Ch.	36x4	36x4d	Service.	103	6	Bu-YBU	4 1/2 x 5 1/2	B-L.	Ti-6760.	WO.	36x6	40x12			
Mack.	AB 2 1/2	3850	Own.	4 1/2 x 5	Own.	Own.	DR.	36x4	36x4d	Signal.	NF 1 1/2	3 1/2 x 4	Co-J4.	3 1/2 x 5	B-L.	Ti-6352.	WO.	34x5n	36x6			
Mack.	AC 3 1/2	4950	Own.	5x6	Own.	Own.	Ch.	36x5	40x5d	Signal.	H 2 1/2	4 1/2 x 5 1/2	Co-K4.	4 1/2 x 5 1/2	B-L.	Ti-6460.	WO.	34x4	36x6			
Mack.	AC 5	5500	Own.	5x6	Own.	Own.	Ch.	36x6	40x6d	Signal.	J 3 1/2	4 1/2 x 5 1/2	Co-K4.	4 1/2 x 5 1/2	B-L.	Ti-6560.	WO.	34x4	36x8			
Mack.	AC 7 1/2	5750	Own.	5x6	Own.	Own.	Ch.	36x6	40x12	Signal.	M 5	4 1/2 x 6	Co-B5.	4 1/2 x 6	B-L.	Ti-6666.	WO.	34x5	36x10			
Mack.	AC 7 1/2	6000	Own.	5x6	Own.	Own.	Ch.	36x7	36x7d	Signal.	R 7 1/2	4 1/2 x 6	Co-B5.	4 1/2 x 6	B-L.	Ti-6760.	WO.	34x5	36x12			
†† Mack.	AB 5	3400	Own.	4 1/2 x 5	Own.	Own.	Ch.	36x4	36x4d	Standard.	75	1 1/4	1330	Co-N.	3 1/2 x 5	B-L.	Ti-6250.	WO.	33x5n	33x5n		
†† Mack.	AC 7	4950	Own.	5x6	Own.	Own.	Ch.	36x5	40x5d	Standard.	21 1/2	2 1/2	2795	Co-K4.	4 1/2 x 5 1/2	B-L.	Ti-6560.	WO.	36x4	36x8		
†† Mack.	AC 10	5500	Own.	5x6	Own.	Own.	Ch.	36x6	40x6d	Standard.	3 1/2 K 3 1/2	2 1/2	3645	Co-L4.	4 1/2 x 5 1/2	B-L.	Ti-6666.	WO.	36x5	36x12		
†† Mack.	AC 13	5750	Own.	5x6	Own.	Own.	Ch.	36x6	40x12	Standard.	5K 5	5	4495	Co-B5.	4 1/2 x 6	B-L.	Ti-6760.	WO.	36x6	40x14		
Mack.	AC 15	6000	Own.	5x6	Own.	Own.	Ch.	36x7	40x7d	Star.	1 1/2	610b	Co.	3 1/2 x 5 1/2	Own.	War.	Fl.	SB.	30x3 1/2	30x3 1/2		
Mason.	1 1/2	1200	He.	4 1/2 x 5	Hoo.	War.	Fl.	SB.	34x5n	34x5n	Sterling.	1 1/2	3240	Wa-FU.	4 1/2 x 5	B-L.	Ti-6460.	WO.	36x3 1/2	36x5k		
Master.	11 1/2		Bu-WTU	3 3/4 x 5 1/2	Ful.	Ful.	Ti-5511.	SB.	33x5n	33x5n	Sterling.	2	3440	Wa-FU.	4 1/2 x 5	B-L.	Ti-6560.	WO.	36x4	36x8		
Master.	21 1/2		Bu-OU	4 1/2 x 5 1/2	Ful.	Ful.	Ti-6460.	WO.	34x4	34x6	Sterling.	2 1/2	3700	Wa-CU.	4 1/2 x 5 1/2	B-L.	Ti-6560.	WO.	36x4	36x4d		
Master.	41 2 1/2		Bu-ETU	4 1/2 x 5 1/2	Ful.	Ful.	Ti-6560.	WO.	34x4	36x8	Sterling.	3 1/2	4750	Bu-YDU	4 1/2 x 5 1/2	H-S.	Own.	Ti-6666.	WO.	36x5	40x5d	
Master.	51 3 1/2		Bu-YTU	4 1/2 x 6	B-L.	B-L.	Ti-6666.	WO.	36x5	40x10	Sterling.	5	5409	Eu-YU.	5x6 1/2	H-S.	Own.	Ti-6760.	WO.	36x6	40x6d	
Master.	61 5		Bu-YTU	4 1/2 x 6	B-L.	B-L.	Ti-6760.	WO.	36x6	40x12	Sterling.	6	6000	Bu-EU.	5x6 1/2	H-S.	Own.	Ch.	36x6	40x6d		
Master.	64 5-6		Bu-ATU	4 1/2 x 6	B-L.	B-L.	Ti-6760.	WO.	36x6	40x14	Stewart.	16	990	Co.	3 1/2 x 5 1/2	SB.	34x4 1/2	34x4 1/2				
Maxwell.	1 1/2	1095	Own.	3 1/2 x 4 1/2	Own.	Own.	Ch.	36x5	35x5n	Stewart.	15-X 1-1	1495	Bu-MU.	3 1/2 x 5 1/2	B-L.	Ful.	Cl-AW.	IG.	35x5n	35x5k		
Menominee.	B 1	1650	Wi-SU.	4x5	B&B.	Del.	Co-5200.	SB.	35x5n	35x5n	Stewart.	2	1870	Co-N.	3 1/2 x 5 1/2	B-L.	Ful.	Cl-1D.	IG.	34x3 1/2	34x6	
Menominee.	HT 1/2	2000	Wi-FAU.	3 3/4 x 5	Ful.	Del.	Co-8000.	SB.	34x3 1/2	36x5k	Stewart.	7K 2 1/2	2500	Bu-HTU	4 1/2 x 5 1/2	B-L.	Ful.	Cl-2D.	IG.	34x4k	34x8k	
Menominee.	H 1 1/2	2475	Wi-EAU.	4x5	Ful.	Del.	Co-8000.	SB.	36x3 1/2	36x5k	Stewart.	10X 3 1/2	3440	Bu-YTU	4 1/2 x 5 1/2	B-L.	Ful.	Cl-3D.	IG.	36x5	36x12	
Menominee.	D 2 1/2-3 1/2	2875	Wi-TAU.	4x5	Ful.	Del.	Co-8000.	SB.	36x4	36x8	Stoughton.	AS 1 1/2-1	1185	Mi-410.	3 1/2 x 4 1/2	Del.	Cam.	Co-5200.	SB.	34x4 1/2	34x4 1/2	
Menominee.	J 5	4850	Wi-RAU.	4 1/2 x 6	Ful.	Del.	Ti-6760.	WO.	36x6	40x12	Stoughton.	AS 1/4	2100	2400	Bu-WA-BU.	3 1/2 x 5 1/2	B-L.	Del.	Co-5200.	SB.	34x3 1/2	36x5
Moline.	10 1 1/2	1695	Own.	3 1/2 x 5	B&B.	Own.	To-A.	SB.	34x5n	34x6	Stoughton.	1/2	2100	2400	Wa-FU.	3 1/2 x 5 1/2	B-L.	Del.	Co-5200.	SB.	34x3 1/2	36x5
Nash.	2018 1 1/2	1595	Own.	3 3/4 x 5 1/4	B&B.	Own.	Cl-ID.	IG.	34x4	34x5	Stewart.	15-X 2	1495	Bu-MU.	3 1/2 x 5 1/2	B-L.	Ful.	Cl-1D.	IG.	34x3 1/2	34x6	
Nash.	4017F 2 1/2-2 1/2	2750	Bu-HU.	4 1/2 x 5 1/2	B&B.	Own.	IG.	36x6	36x6	Stewart.	9	1870	Co-N.	3 1/2 x 5 1/2	B-L.	Ful.	Cl-2D.	IG.	34x4k	34x8k		
Nash.	3018 2 1/2-2 1/2	2150	Own.	3 3/4 x 5 1/4	B&B.	Del.	Cl-2D.	IG.	34x4	34x7	Stewart.	7K 2 1/2	2500	Bu-HTU	4 1/2 x 5 1/2	B-L.	Ful.	Cl-3D.	IG.	36x5	36x12	
Nash.	5018 2 1/2-2 1/2	2250	Own.	3 3/4 x 5 1/4	B&B.	Del.	Cl-2D.	IG.	34x4	34x7	Stoughton.	D 2	2400	He-CU3.	4 1/2 x 5 1/2	B-L.	Sh.	1501.	WO.	36x4	36x7	
Noble.	A-75 1	1395	Bu-WTU	3 3/4 x 5 1/2	Ful.	Ful.	Ti-300.	SB.	34x4 1/2	34x4 1/2	Stoughton.	D 2	3100	He-MI.	402.	B-L.	Sh.	102.	WO.	36x4	36x7	
Noble.	A-21 1 1/2	1890	Bu-WTU	3 3/4 x 5 1/2	Ful.	Ful.	Ti-1501.	WO.	34x5	34x5	Stewart.	16	990	Co.	3 1/2 x 5 1/2	SB.	34x4 1/2	34x4 1/2				
Noble.	B-31 2	3795	Wi-CTU	3 3/4 x 5 1/4	Ful.	Ful.	Ti-103.	WO.	36x4	36x7	Stewart.	15-X 2	1495	Bu-MU.	3 1/2 x 5 1/2	B-L.	Ful.	Cl-1D.	IG.	34x3 1/2	34x6	
Noble.	D-21 5 1/2	3150	Wi-BTU	4 1/2 x 5 1/2	Ful.	Ful.	Ti-21.	WO.	36x4	36x8	Stewart.	2	1870	Co-N.	3 1/2 x 5 1/2	B-L.	Ful.	Cl-2D.	IG.	34x4	36x6	
Noble.	E-7 1 1/2-5	3850	Wi-YTU	4 1/2 x 5	Ful.	Ful.	War.	SB.	36x5	36x10	Stewart.	7K 2 1/2	2500	Bu-HTU	4 1/2 x 5 1/2	B-L.	Ful.	Cl-3D.	IG.	34x4	36x12	
Old Reliable.	B 2 1/2	3500	Wi-UAU.	4 1/2 x 5 1/2	Ful.	Ful.	Ti-6666.	WO.	36x5	36x5d	Stewart.	10X 3 1/2	3440	Bu-YTU	4 1/2 x 5 1/2	B-L.	Ful.	Cl-4D.	IG.	34x4	36x12	
Old Reliable.	C 3 1/2-5	4250	Wi-YAU.	4 1/2 x 6	B-L.	B-L.	Ti-6760.	WO.	36x6	40x6d	Stewart.	12	1290	He-CU3.	4 1/2 x 5 1/2	B-L.	Ful.	Cl-5E.	IG.	34x4	36x12	
Old Reliable.	D 5	5000	Wi-RAU.	4 1/2 x 6	B-L.	B-L.	Ti-6760.	WO.	36x6	40x12	Stewart.	12	1290	He-CU3.	4 1/2 x 5 1/2	B-L.	Ful.	Cl-6F.	IG.	34x4	36x12	
Pierce-Arrow RF 7	5200	Own.	4 1/2 x 5 1/2	Own.	Own.	Ch.	36x6	40x8d	Stewart.	12	1290	He-CU3.	4 1/2 x 5 1/2	B-L.	Ful.	Cl-7G.	IG.	34x4	36x12			
Rainier.	R31 1 1/2	895	Co-N.	3 3/4 x 5	B-L.	B-L.	Ti-6250.	SB.	35x5n	35x5n	Stewart.	12	1290	He-CU3.	4 1/2 x 5 1/2	B-L.	Ful.	Cl-8H.	IG.	34x4	36x12	
Rainier.	R29 1	3650	Co-N.	3 3/4 x 5	B-L.	B-L.	Ti-6250.	SB.	34x3 1/2	34x4 1/2	Stewart.	12	1290	He-CU3.	4 1/2 x 5 1/2	B-L.						

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

CANADIAN

MAKE AND MODEL	Tons Capacity	Price	ENGINE			Gearset Make	REAR AXLE	TIRES	MAKE AND MODEL	Tons Capacity	ENGINE			Gearset Make	REAR AXLE	TIRES	
			Make & Model	Bore & Stroke	Clutch Make						Make & Model	Bore & Stroke	Clutch Make				
Goffredson... 20	3/4-1	\$1685	Bu-WTU	3 3/4 x 5 1/8	B-L.	Ti-6250.	WO.	34x5n	National... FA	1	Wa-BUX	3 3/4 x 5 1/4	B-L.	Ti-6352.	WO.	35x5n	
Goffredson... 40	1 1/2-2	2300	BU-GTU	4 x 5 1/2	B-L.	Ti-6460.	WO.	36x6n	National... GA	1 1/2	Wa-BUX	3 3/4 x 5 1/4	B-L.	Ti-6460.	WO.	34x6n	
Goffredson... 50	2 1/2	3000	Bu-Etu	4 1/4 x 5 1/2	B-L.	Ti-6560.	WO.	36x8	National... HD	2 1/2	Wa-CU	4 3/8 x 5 3/4	H-S.	Ti-6560.	WO.	36x10	
Goffredson... 80	4	3975	Bu-YTU	4 1/2 x 6	B-L.	Ti-6666.	WO.	34x5	National... NB	3 1/2	Wa-DU	4 1/2 x 6 1/4	H-S.	Ti-6666.	WO.	36x6	
Goffredson... 100	5	4800	Bu-BTU	5 x 6 1/2	B-L.	Ti-6760.	WO.	30x6	National... OA	4	Wa-EU	5 x 6 1/4	H-S.	Ti-6760.	WO.	36x7	
Mapleleaf... 1 1/2	3000	Hi-300.	3 3/4 x 5 1/4	Ful.	Ful.	Sh-1501.	WO.	34x5	Veteran... M	1 1/2	\$2699	3 3/4 x 5 1/4	B&B.	Cot.	Sh-1501.	WO.	34x5n
Mapleleaf... AA	2	3600	Hi-100.	4 x 5 1/4	Ful.	Sh-103.	WO.	36x4	Veteran... P	2	3699	4 x 5 1/4	B&B.	Cot.	Sh...	WO.	36x7
Mapleleaf... BB	3	4050	Hi-500.	4 1/4 x 5 1/2	Ful.	Sh-21.	WO.	36x4	Veteran... R	3	4200	4 x 5 1/2	B&B.	Cot.	Sh-21.	WO.	36x7
Mapleleaf... CC	4	4800	Hi-200.	4 1/2 x 5 1/2	Ful.	Sh-31.	WO.	36x5	Veteran... S	4	5395	4 1/2 x 6	B&B.	Cot.	Sh-31.	WO.	36x5
Mapleleaf... DD	5	5625	Hi-1600.	4 1/2 x 5 1/2	Ful.	Sh-51.	WO.	36x6									

Current Tractor Specifications

MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plows	ENGINE			Gearset Make	REAR AXLE	TIRES	MAKE & MODEL	Traction Members Dimension, Diameter & Face (In.)	Weight (Lbs.)	Drawbar-Pulley Rating	Gearset Make	REAR AXLE	TIRES	MAKE & MODEL	Traction Members Dimension, Diameter & Face (In.)	Weight (Lbs.)		
			Make	No. of Cyls.	Bore & Stroke					Make							Make			
Allis-Chalmers... 6-12	1	\$295	LeR.	4-3 x 4	2500	48x6	Wau.	4-1 x 6	Gray... DU	18-36	Wau.	4-3 x 6	2150	Wau.	4-3 x 6	Rumely OilPull	30-60	8-10		
Allis-Chalmers... 15-25	3	1185	Mid.	4-4 x 5	4700	46x12	4-4 x 6	2385	Gray... EU	22-40	4	4-4 x 6	6900	Wau.	4-4 x 6	Russell...	15-30	3-4		
Allis-Chalmers... 20-35	4	1885	Own.	4-4 x 5	6150	48x14	4-4 x 6	4438	Hart-Parr... 20	-20	2	Own.	2-5 x 6	5220	Wau.	4-4 x 6	Russell...	20-40	4-5	
Allwork... D	20-38	4-5	1695	Own.	4-5 x 7	6500	48x14	4-6 x 7	Hart-Parr... 30	-30	3	Own.	2-6 x 7	7560	Wau.	5 x 6	Shaw-Enochs (Gr.)	30-60	8-10	
Allwork... G	14-28	3	1495	Own.	4-4 x 6	4800	48x12	4-6 x 7	Hart-Parr... (Road)	-30	3	Own.	2-6 x 7	4000	Wau.	4-4 x 6	Topp-Stewart... B	30-45	4	
Allwork... H	16-30	3	1295	Own.	4-5 x 6	5200	48x12	4-6 x 7	Heider... D	9-16	2	Wau.	4-4 x 5	5710	Wau.	4-4 x 6	Toro...	6-10	2	
Allwork... I	15-30	3	1900	Clh.	4-5 x 6	7800	70x12	4-6 x 7	Heider... C	12-20	3	Wau.	4-4 x 6	2800	LeR.	4-3 x 4	Townsend...	10-20	2-3	
Allwork... J	22-45	4-6	3100	Own.	4-5 x 8	12500	70x20	4-6 x 8	Heider... M-2	5-10	5	Wau.	4-4 x 6	5000	LeR.	4-3 x 4	Townsend...	15-30	3-4	
Allwork... K	30-60	8-10	4400	Own.	4-7 x 9	22500	90x24	4-7 x 9	Huber... (Light 4)	12-25	3	Wau.	4-4 x 5	6000	LeR.	4-3 x 4	Townsend...	25-50	4-8	
Avery... 15	15	3	3450	Own.	4-4 x 6	4750	50x12	4-4 x 6	Huber... (Super 4)	15-30	3	Mid.	4-4 x 6	4200	LeR.	4-3 x 4	Traylor...	6-12	1	
Avery... 20-35	4-5	3	3450	Own.	4-4 x 7	7500	60x16	4-4 x 7	Lauson... S	12-25	3	Mid.	4-4 x 5	4200	LeR.	4-3 x 4	Twin City...	12-20	3	
Avery... 25-50	5-6	6	3450	Own.	4-5 x 7	12500	69x20	4-5 x 7	Lauson... T	15-30	4	Bea.	4-4 x 6	6000	LeR.	4-3 x 4	Twin City...	20-35	5	
Avery... 45-65	8-10	3	3450	Own.	4-7 x 8	22000	87x24	4-7 x 8	McCor'k-Deering... 2	10-20	2	850	Own.	4-4 x 5	3700	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 3	15-30	3	2500	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 4	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 5	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 6	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 7	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 8	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 9	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 10	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 11	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 12	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 13	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 14	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 15	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 16	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 17	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 18	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 19	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 20	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 21	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 22	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 23	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	3-4
Avery... 45-65	8-10	3	3450	Own.	4-5 x 8	5000	68x11	4-5 x 8	McCor'k-Deering... 24	15-30	3	1250	Own.	4-4 x 6	5750	Own.	2-10 x 12	Wau...	10-20	

Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES								NAME AND MODEL	ENGINE			ELECTRICAL SYSTEM		Universal: Type and Make	Type and Gear Ratio	REAR AXLE	BRAKES, Service and Emergency			
OPEN MODELS			CLOSED MODELS		Wheel Base (In.)	Tire Size (In.)†	Make and Model		No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.C.)	Carburetor Make	Generator and Starter Make	Ignition Make							
2-3 Pass.	4-5 Pass.	6-7 Pass.	Sport Models	2-3 Pass.	4-5 Pass.	6-7 Pass.														
\$1950e	\$1785	\$1850	\$1885e	\$2250	\$2485	127	33x4½	American.....D-66	H-S. 11000	6-3½x25	29.40	Strom...	G-D.	A-K.	s-p B&B.	B & B.	m Hart	F. Salis 4.50	R-L-T	
1195	1445e	1425	1785b	1895p	114	32x4	Anderson.....41	Cont. 7 U	6-3½x4½	23.44	Zeith...	s-p B&B.	Durston.	f Univ.	3½F Salis 4.75	R-L-T				
1495	1495	1505	1785b	1995e	1995d	122	32x4	Anderson.....Series 50	Cont. 8 R	6-3½x4½	27.31	Rayfield.	Remy.	Remy.	s-p B&B.	Durston.	f Univ.	3½F Salis 4.62	R-L-T	
1535	2485	2485		2200	120	32x4	Apperson.....6	Own...	6-3½x4½	23.44	Strom...	Remy.	Remy.	s-p Rock.	Mech.	m Thie.	3½F Col. 5.10	R-L-T		
1095	1325d	1495e	1595	3385	130	33x5	Apperson.....8-23-S	Own...	8-3½x5	33.80	Johnson	Bijur.	Remy.	s-p M-d Own.	m Thie.	3½F Own. 4.25	R-L-T			
1595	1850d	1850d		114	31x4	Auburn.....6-43	Cont. 6 Y	6-3½x4½	23.44	Strom...	Remy.	Remy.	s-p B&B.	Warner.	m Detr.	3½F Col. 4.60	R-L-T			
1395	1495	1495		2345	124	32x4½	Auburn.....6-63	Own...	6-3½x4½	25.35	Strom...	Remy.	Remy.	s-p B&B.	Warner.	m Thie.	3½F Col. 4.60	R-L-T		
1385g	1505	1675a	1725d	2235†	2285	128	32x4½	Barley.....	Cont. 6 Y	6-3½x4½	23.44	Strom...	Delco.	Deleo.	s-p B&B.	Fuller.	M&E.	3½F Col. 5.10	R-L-T	
2985	2985	2985		3875	3950	132	33x5	Cadillac.....V 63	Own...	8-3½x5	31.25	Own...	Deleo.	Deleo.	m-d Own.	Own...	m Spicer	F. Tim Opt.	R-L-T	
1750	1790	2230d	2480e	2575	122	32x4½	Case.....X	Cont. 8 R	6-3½x4½	27.34	Schebler.	Deleo.	Deleo.	m-d Own.	Own...	f Snead.	3½F Col. 4.90	R-L-T		
2475	1335d	1335d		3325	132	33x5	Case.....Y	Cont. 6 T	6-3½x5	31.54	Rayfield.	Deleo.	Deleo.	m-d Own.	Own...	f Snead.	3½F Col. 4.70	R-L-T		
1185	1295	1335d		1535	117	32x4	Chalmers.....1923	Own...	6-3½x4½	25.35	Strom...	A-L.	Remy.	m-d Own.	Own...	m Mech.	3½F T.m 5.13	R-L-T		
1260	1410d	1410d		2095	122	32x4	Chalmers.....1923	Own...	6-3½x4½	25.35	Strom...	A-L.	Remy.	m-d Own.	Own...	m Mech.	3½F Tim 5.13	R-L-T		
1595	1485	1635	1785c	1785	2385	123	32x4	Chalmers.....Six	Own...	6-3½x4½	29.40	Strom...	Bosch.	s-p B&B.	m-d Own.	Own...	f Own.	F. Tim 4.45	R-L-T	
490	495	395g		640	795	103	30x3½	Chevrolet.....Superior	Own...	4-3½x4	21.70	Zenith.	Remy.	Remy.	c Own.	Own...	m Own.	3½F Own. 3.77	R-L-T	
1085	1045	1145d	1245	1365	1645d	112½	31x4	Cleveland.....42	Own...	6-3½x4½	22.50	Strom...	Bosch.	s-p B&B.	Own...	Own...	m Mech.	3½F Own. 4.90	R-L-T	
2175	2175	2750c	3075	3075	127½	33x5	Cole.....Master	Nort.M309	8-3½x4½	39.20	Johnson.	Delco.	Delco.	m-d Nort.	Nort...	m Spicer	F. Col. 4.70	R-L-T		
1475	1925e	1995	1995	115	115	115	32x4	Columbia.....Big Six	Cont. 8 R	6-3½x4½	27.34	Strom...	A-L.	s-p B&B.	Durston.	m Spicer	3½F Tim 4.75	R-L-T		
985e	985	1195d	1395	1495	p1995d	115	31x4	Columbia.....Light Six	Cont. 6 Y	6-3½x4½	23.44	Strom...	A-L.	s-p B&B.	Durston.	m Spicer	3½F Tim 5.10	R-L-T		
1395p	1295	1595e	1495	2195†	1895†	116	32x4	Courier.....	Falls. 8000	6-3½x4½	23.44	Strom...	West.	A-K.	s-p B&B.	Muncie.	f Flex. 3½F Col. 5.10	R-L-T		
3100	3110	3500c		4500	138	33x4½	Crawford.....23-6-70	Cont. 6 T	6-3½x5½	31.54	Zenith.	West.	Bosch.	m-d B-L.	B-L.	m Spicer	3½F Tim 4.25	R-L-T		
5900	6300		3500c	4500	138	33x5	Crawford-Dagmar.6-70	Cont. 6 T	6-3½x5½	31.54	Zenith.	West.	Bosch.	m-d B-L.	B-L.	m Spicer	3½F Tim 4.25	R-L-T		
5000	4650	4650	4800	6350	6450	132	33x5	Daniels.....23-38	Own...	8-3½x5½	39.20	Zenith.	Delco.	Delco.	m-d Own.	Own...	m Spicer	F. Tim 4.23	R-L-T	
5000	5150	6000c	6600	6800	138	33x5	Daniels.....23-38	Own...	8-3½x5½	39.20	Zenith.	Delco.	Delco.	m-d Own.	Own...	m Spicer	F. Tim 4.25	R-L-T		
1295	1495	1495c	1595	1595	1795c	115	31x4	Davis.....71	Cont. 7 U	6-3½x4½	23.44	Strom...	Deleo.	s-p B&B.	Warner.	m Peters	23½F Own. 4.45	R-L-T		
850	880	730g	1035	1250	116	32x4	Dodge Brothers.....	Own...	4-3½x4½	24.03	Stewart.	N.E.	m-d Own.	m Own.	½F Own.	4.1t	R-L-T			
3950	3950	4150e	4985e	5500	5800	136	33x5	Dorris.....6-80	Own...	6-4 x5	38.40	Strom...	Bosch.	m-d Own.	Warner.	m Spicer	3½F Tim 4.23	R-L-T		
1010	1095	1245c	1535d	1595	1515	115	31x4	Dort.....25-20	FallsT8000	6-3½x4½	23.44	Carter.	Bosch.	m-d Det.	Own...	m Ther.	3½F Fln. 6t	R-L-T		
6250	6500	6500c	7500	7800	134	33x5	Duesenberg. Straight 8	Own...	8-2½x5	26.45	Strom...	Deleo.	s-p Own.	Own...	f Chi.	3½F Own. 4.45	R-L-T			
890	850	1065d	1365	1365	109	31x4	Durant.....A-22	Cont. Spec	4-3½x4½	24.03	Till.	A-L.	s-p Own.	Warner.	m Spicer	3½F Ad. 4.33	R-L-T			
1000	1650		2250	2400	123½	32x4½	Durant.....B-22	Anst...D	6-3½x4½	25.35	Rayfield.	A-L.	s-p Anst.	Warner.	m, Spi	3½F Tim 5.15	R-L-T			
1485	1095	1275d	1395c	1595	122	32x4	Earl.....40	Own...	4-3½x5½	18.91	Scoe.	A-L.	Conn.	s-p B&B.	Own...	f Own.	3½F Own. 4.87	R-L-T		
995	1295	1135d	1425	1595	122	31x4	Elcar.....4-40	Own...	4-3½x5½	21.03	Strom...	Deleo.	s-p B&B.	Warner.	m Peters	23½F Own. 4.56	R-L-T			
1395	1395	1395d	1995d	1995	128	32x4	Elcar.....6-60	Cont. 8 R	6-3½x4½	27.34	Strom...	Deleo.	s-p B&B.	Warner.	m Spicer	23½F Own. 4.66	R-L-T			
1045	1145	1145	108½	1145	1145	32x4	Esser.....	Own...	4-3½x5	18.23	Strom...	Bosch.	m-d Own.	Own...	m Spicer	23½F Own. 4.66	R-L-T			
1195	1195	1195	1895c	1985	120	32x4½	Flint.....	Cont. Spec	6-3½x5	27.34	Strom...	DeJon.	DeJon.	s-p Own.	Warner.	m Spicer	3½F Ad. 4.33	R-L-T		
265r	295s	230g	525	685	100	30x3½	Ferd.....T	Own...	4-3½x4	22.50	Own...	Own...	m-d Own.	Own...	m Own.	3½F Own. 3.63	T-L-T			
2975	2975		3975	3975	132	32x4½	Fox.....Air-Cooled	Own...	6-3½x5	27.34	Zenith.	West.	Scintilla.	m-d B-L.	B-L.	m Spicer	3½F Tim 4.90	R-L-T		
1980	1980		2750c	2250	115	32x4	Franklin.....10	Own...	6-3½x4	25.35	Own...	Own...	A-K.	s-p B&B.	Own...	m Spicer	2800c 4.73	T-L-T		
905	905	1095d	1145c	1145	1145	112	32x4	Gardner.....Series 5	Lye...CE	4-3½x5	21.70	Zenith...	West.	West.	s-p B&B.	Mech.	m Peters	3½F Fln. 4.80	R-L-T	
510	520	625d	685	835	100	30x3½	Gray.....	Own...	4-3½x4	21.03	Scoe.	West.	West.	s-p Own.	Own...	m Mech.	3½F Tim. 3.90	R-L-T		
2250	2250		2850†	2600	120	32x4½	H.C.S.....Series 4	Weid...	4-3½x5½	22.50	Strom...	Delco.	Delco.	m-d B-L.	B-L.	m Spicer	3½F Own. 4.63	R-L-T		
2650			2850†	2600	126	32x4½	H.C.S.....Series 6	Midw...	6-3½x5	29.40	Strom...	Delco.	Delco.	m-d B-L.	B-L.	m Spicer	3½F Own. 4.30	R-L-T		
1395	1395	1495c	2195	2195	121	32x4	Hanson.....66	Cont. 8 R	6-3½x4½	27.31	Marvel.	Deleo.	Deleo.	s-p B&B.	G-L.	m Univ.	2195 4.66	R-L-T		
1345	1345	1345c	1950	1950	115	32x4	Hatfield.....A-42	H-S. 7000	4-3½x5	19.60	Zenith.	Dyneto.	Conn.	s-p B&B.	G-L.	m Spicer	24P Col. 4.66	R-L-T		
1925s	1775	1795	1975d	2175	2275	121	32x4	Hatfield.....55	H-S. 11000	6-3½x4½	25.35	Strom...	Bosch.	Bosch.	s-p B&B.	G-L.	m Spicer	24P Col. 4.63	R-L-T	
1995	1995	2150	2695†	2795	132	33x5	Haynes.....77	Own...	6-3½x5½	31.54	Strom...	L-N.	Kingst.	m-d War.	Own...	m Univ.	2800 4.60	R-L-T		
2250	1295	1695b	2195	1895	2295d	121	32x4½	Haynes.....60	Own...	6-3½x4½	20.40	Rayfield.	L-N.	Kingst.	m-d War.	Own...	m Univ.	3½F Own. 4.41	R-L-T	
1295	1350	1375d	1895	126	31x4½	115	32x4	Hudson.....Super 6	Own...	6-3½x5	29.40	Bosch.	Bosch.	m-d Own.	Own...	m Spicer	3½F Own. 4.45	R-L-T		
1175	1175	1195a	1445	1750	115	32x4	Hupmobile...Series R	Own...	4-3½x5½	16.90	Strom...	West.	A-K.	m-d Long.	Own...	m Spicer	3½F Own. 4.67	R-L-T		
1195	1065	960g	1220d	1325	112	31x4	Jewett.....Six	Own...	6-3½x5	25.36	Strom...	Remy.	A-K.	m-d Long.	Warner.	m Mech.	3½F Tim. 4.45	R-L-T		
1750	1675		2285c	2285	120	32x4	Jordan.....MX	Cont. Spec	6-3½x4½	26.34	Strom...	Deleo.	Deleo.	s-p Detr.	Detroit.	m Thie.	3½F Tim. 4.42	R-L-T		
1995	1995	2150	2695†	2795	132	33x5	Jordan.....H&L	Cont. Spec	6-3½x4½	26.34	Strom...	Deleo.	Deleo.	s-p Detr.	Detroit.	m Thie.	3½F Tim. 4.42	R-L-T		
2095	1585	1785d	2485c	2285	121	32x4	Kelsey.....G	Lye...CF	4-3½x5½	21.03	Zenith.	Bosch.	Bosch.	s-p B&B.	W-M.	m Spicer	3½F Salis 4.70	R-L-T	</	

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Division of General Motors Corporation

CADILLAC



STANDARD OF THE WORLD

Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES										NAME AND MODEL	ENGINE			ELECTRICAL SYSTEM		Universal: Type and Make	Type and Make	REAR AXLE	BRAKES, Service and Emergency		
OPEN MODELS			CLOSED MODELS			Wheel Base (In.)†		Make and Model	No. of Cyl. Bore and Stroke	Horse Power Rating (N.A.C.)	Carburetor Make	Generator and Starter Make	Ignition Make	Clutch: Type and Make							
2-3 Pass.	4-5 Pass.	6-7 Pass.	Sport Models	2-3 Pass.	4-5 Pass.	6-7 Pass.	Tire Size (In.)†														
5000 1795	5000 1795	4200c 2145d	4200c 2145d	6300 2345	6500 2345	132 123	33x5 32x4½	LaFayette, Lexington.	8-3½x5½	33.80	Johnson, Rayfield.	Delco, Delco.	m-d Own., G-D.	Own., Conn.	m Own., Warner.	F Own., f Salis.	4.58	RL-R ²			
1795 2095	2195			2345 2345	2645				6-3½x4½	25.35							5.10	RL-T ¹			
3800	3800c	3800		4600c	4400	4900	136	Lincoln.	8-3½x5	36.45	Strom.	Deleo.	m-d Own.	Own.	m Spicer, f Tim.	4.58	RL-R ²				
8000	7900	7900		4700	5100c	5100c	136	Locomobile, Series 18	6-4½x5½	48.00	Ball&B.	West.	m-d Own.	Own.	m Own., f Own.	3.85	RL-R ¹				
2300g	2785	2785	2985a	3585	4285s	136	32x4½	Marmon.	6-3½x5½	33.75	Strom.	Deleo.	m-d Own.	Own.	m Spicer, ½F Own.	4.10	RL-R ¹				
2425g	2910	2910	3110a	3710	4110s	136	32x4½	Marmon.	6-3½x5½	33.75	Strom.	Deleo.	m-d Own.	Own.	m Spicer, ½F Own.	4.10	RL-R ¹				
795	795	p960d	895b	935	1195	1585d	109	Maxwell.	4-3½x4½	21.03	Stewart.	Remy.	e Own.	Own.	f Own., ½F Own.	4.60	RL-T ¹				
5400	5600	5700		6720	6600c	6810	140	McFarlan.	6-4½x6	48.60	Rayfield.	West.	m-d M&E.	B-L.	m Peters, F Tim.	3.75	RL-R ¹				
3950b	3950c	3950c	4850	5250	5000	132	32x4½	Mercer.	4-3½x5½	22.50	Ball&B.	West.	Own.	Own.	m Spicer, F Own.	3.87	RL-R ¹				
1295	1295		3110c	4110	4110	132	32x4½	Mercer.	6-3½x5	33.75	Strom.	West.	Own.	Own.	m Spicer, ½F Tim.	3.77	RL-R ¹				
1295			1495d	1695	115	115	31x4	Moon.	6-3½x4½	23.44	Strom.	Deleo.	s-p B&B.	Warner.	m Spicer, ½F Tim.	5.10	RL-T ¹				
			1785	195c	2585	2485	128	Moon.	6-3½x4½	27.34	Strom.	Deleo.	s-p B&B.	B-L.	m Spicer, ½F Tim.	5.09	RL-R ¹				
			195f	2685s			32x4½	Cont.	8 R	6-3½x4½	27.34	Strom.	Deleo.	s-p B&B.	B-L.	m Spicer, ½F Tim.	5.09	RL-R ¹			
1240	1240	1645c		2090	121		33x4	Nash.	691-3-6-7	Own.	Marvel.	Delco.	s-p B&B.	Own.	m Own., ½F Own.	4.50	RL-T ¹				
915	935		1390	1890	2190	127	31x4½	Nash.	692-4-5-8	Own.	Marvel.	Delco.	s-p B&B.	Own.	m Own., ½F Own.	4.90	RL-T ¹				
			1195d	1445	1275	112	33x4	Nash.	41-8	Own.	Marvel.	Delco.	s-p B&B.	Own.	m Own., ½F Own.	4.88	RL-T ¹				
2475	2475c	2485d		3250	3285	130	32x4½	National.	BB	Own.	Rayfield.	West.	m-d M&E.	B-L.	m Univ., F Col.	4.08	RL-R ¹				
2500	2500r	2600c		3500		128	33x5	Noma.	4C	Cont.	8 R	6-3½x4½	27.34	Zenith.	Deleo.	s-p B&B.	Detroit.	m Spicer, ½F Tim.	4.45	RL-R ¹	
945	915		1095a	1195	1345	113	31x4	Oakland.	6-5-4	Own.	6-2½x4½	19.00	Marvel.	Remy.	e Hoos.	Muncie.	½F Own.	4.70	RL-T ¹		
750	750		1095d	955	1035	110	31x4	Oldsmobile.	6	Own.	6-2½x4½	18.15	Zenith.	Delco.	s-p B&B.	Own.	f Ther.	½F Own.	4.70	RL-T ¹	
495	495		395g	750	795	695d	100	Overland.	91	Own.	4-3½x4	19.60	Till.	A-L.	s-p B&B.	Own.	m Own., ½F Own.	4.50	RL-R ¹		
			695			106	30x3½	Overland.	92	Own.	4-3½x4	19.60	Till.	A-L.	s-p B&B.	Own.	½F Own.	4.50	RL-R ¹		
2485	2485		2650c	3175c	3275	3350d	126	Packard.	126	Own.	6-3½x5	27.34	Own.	A-K.	Deleo.	m-d Own.	Own.	m Spicer, ½F Own.	4.66	RL-R ¹	
	2085			3525f	3575s	133	33x4½	Packard.	133	Own.	6-3½x5	27.34	Own.	A-K.	Deleo.	m-d Own.	Own.	m Spicer, ½F Own.	4.66	RL-R ¹	
3850	3850		4550c	4725	4700s	136	33x5	Packard "Eight".	136	Own.	8-3½x5	36.45	Own.	Dyneto.	Deleo.	m-d Own.	Own.	m Spicer, ½F Own.	4.70	RL-R ¹	
2695	2450			4900c	4950s	143	33x5	Packard "Eight".	143	Own.	8-3½x5	36.45	Own.	Dyneto.	Deleo.	m-d Own.	Own.	m Spicer, ½F Own.	4.70	RL-R ¹	
			3235	3235	131	33x4½	Paige.	6-70	Cont.	9 A	6-3½x5	33.75	Rayfield.	Remy.	A-K.	m-d Long.	Warner.	m Mechn.	½F Tim.	4.60	RL-R ¹
1550	1390	1425	1465d	2395		120	32x4½	Paterson.	23-6-52	Cont.	8 R	6-3½x4½	27.34	Strom.	Deleo.	s-p B&B.	Durston.	m Hart.	½F Salis.	4.50	RL-R ¹
	2690	2750	2260g	3300	3390	340	128	33x5	Peerless.	66	Own.	8-3½x5	33.80	Ball&B.	Delco.	m-d Own.	Own.	m Spicer, ½F Tim.	4.90	RL-R ¹	
5250	5250			6800	6900	6800	138	Pierce-Arrow.		Own.	6-4 x5½	38.40	Own.	Delco.	m-d Own.	Own.	m Spicer, ½F Own.	4.29	RL-R ¹		
1695	1745	2445	2495	2445	126		32x4½	Pilot.	6-5-6	H-S.	6-3½x5	25.35	Till.	Wagner.	s-p Hoos.	Muncie.	m Blood.	½F Col.	4.67	RL-R ¹	
2535	2535	2585d	2635d	3335	3585	126	32x4½	Premier.	6-D	Own.	6-3½x5½	27.34	Strom.	Delco.	s-p B&B.	Own.	m Spicer, ½F Tim.	4.58	RL-R ¹		
2300	2375	2400c	3000d	3050	3250	124	32x4½	R. & V. Knight.	H	Own. Kn'gt	6-3½x4½	29.40	Strom.	A-L.	s-p B-L.	B-L.	m Spicer, ½F Tim.	5.40	RL-R ¹		
	1335		1545d	1875	d2235	120	32x4	Reo.	T-6	Own.	6-3½x5	24.34	Rayfield.	N.E.	m-d Own.	Own.	m Own., ½F Own.	4.70	RL-R ¹		
3200c	3200		3200c	4000		131	32x4½	Revere.	M	Dues.	4-4½x6	28.90	Strom.	West.	Bosch.	m-d B-L.	B-L.	m Spicer, ½F Stnd.	3.44	RL-R ¹	
3200c	3200		3200c	4090		131	32x4½	Revere.	M	Monsen.	4	4-4½x6	30.63	Strom.	West.	Bosch.	m-d B-L.	B-L.	m Spicer, ½F Stnd.	3.44	RL-R ¹
1685c	1485		1885c	1955	117		32x4	Rickenbacker.	B	Own.	6-3½x4½	23.44	Strom.	West.	Bosch.	s-p Own.	Warner.	m Mechn.	½F Col.	1.63	RL-T ¹
1635	1635		2035c	2135	117		32x4	Rickenbacker.	B	Own.	6-3½x4½	23.44	Strom.	West.	Bosch.	s-p Own.	Warner.	m Mechn.	½F Col.	5.10	RL-T ¹
2655	2485	2685	2750c	3285	3585	128	32x4½	Roamer.	6-54-E	Cout. 12XD	6-3½x5½	29.40	Strom.	West.	Split.	s-p B&B.	G-L.	f Snead.	½F Tim.	4.60	RL-R ¹
				3950s	4000			Roamer.	6-54-E	Cont. 12XD	6-3½x4½	29.40	Strom.	West.	Split.	s-p B&B.	G-L.	f Snead.	½F Tim.	4.60	RL-R ¹
	3485	3485	3850c	4650		128	32x4½	Roamer.	4-75-E	Roch.	6-4½x4½	28.90	Strom.	West.	Split.	m-d B-L.	B-L.	f Snead.	½F Tim.	4.08	RL-R ¹
10900	10900	10950		12800	12850	143½	33x5	Rolls-Royce.	40-50	Own.	6-4½x4½	48.60	Own.	Bijur.	Bosch.	s-p Own.	Own.	m Own., F Own.	3.70	RL-R ¹	
				13500	12900	118	32x4	Ruby.		Own.	4-2½x4½	12.10	Strom.	Bosch.	s-p Own.	Own.	m Univ., F Own.	5.10	RL-R ¹		
				5100	5200	118	32x4	Ruby.		Own.	4-2½x4½	12.10	Strom.	Bosch.	s-p Own.	Own.	m Univ., F Own.	4.70	RL-R ¹		
1615	1615		2615d	2615	118		33x4	Sayers Six.	DP	Cont.	8 R	6-3½x4½	27.34	Strom.	Delco.	s-p B&B.	G-L.	m Arvac.	½F Std.	4.75	RL-R ¹
875	875			108	108	103	30x3½	Seneca.	L-2 & O-2	Iyc. KB	4-3½x5	19.60	Zenith.	A-L.	s-p B&B.	G-L.	m Univ., F Own.	1.75	RL-R ¹		
985	985			112	112	112	31x4	Seneca.	50c & 51c	Lyc. KB	4-3½x5	21.03	Zenith.	A-L.	s-p B&B.	G-L.	m Univ., F Own.	4.50	RL-R ¹		
2750	2750	2750	2425g	3585	3985	130	32x4½	Stanley.	740	Own.	2-4 x5	None.	Bijur.	None.	None.	None.	None.	½F Own.	1.50	RL-R ¹	
319r	348s	285g		580	615	102	30x3½	Star.		Cont.	8 R	4-3½x4½	15.03	Till.	A-L.	s-p Own.	Warner.	m Spicer.	½F Tim.	4.87	RL-R ¹
2250	2250	2450	2275c	3150	3450	125	31x4½	Stearns-Knight.	SKL4	Own. Kn'gt	4-3½x5½	22.50	Schebler.	West.	m-d Own.	Own.	f Cli.	½F Tim.	4.50	RL-R ¹	
2700	2700	2850	2700c	3350c	3500	130	34x4½	Stearns-Knight.	6	Own. Kn'gt	6-3½x5	27.34	Schebler.	West.	A-K.	m-d Own.	Own.	f Cli.	½F Tim.	4.70	RL-R ¹
1445	1395		1695d	1995	117		32x4	Stephens.	10	Own.	6-3½x4½	25.35	Strom.	Delco.	s-p B&B.	Mech.	m Mech.	½F Tim.	5.10	RL-T ¹	
	2015	1745	2145c	2385	124		32x4½	Stephens.	20	Own.	6-3½x4½	25.35	Strom.	Delco.	s-p B&B.	Mech.	m Mech.	½F Tim.	5.30	RL-T ¹	
	1985		2200c	2880	d2750p	125	32x4½	Sterling-Knight.		Own. Kn'gt	6-3½x4½	25.35									



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Convenient and Profitable!

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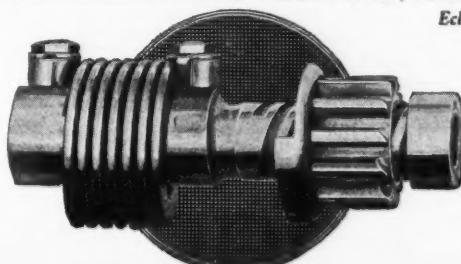
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Trim your windows with accessories that make desirable Christmas gifts and put the streamer pictured above on your window to attract Christmas buyers.

Make the AC Plug Kit, trimmed as pictured below, a part of these displays. The decorated band, which fits across the plug cartons and the card in the cover make the Kit an attractive and desirable gift. Both the band and card are easily put in place and as easily removed.

Any motorist will appreciate a Kit of AC Plugs to carry in his car. Spare plugs make it convenient for him to change plugs when the motor misses or performs poorly, and the Kit protects them from damage.

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Get the AC Christmas Envelope from your jobber

AC Spark Plug Company, FLINT, Michigan

Makers of AC Spark Plugs — AC Speedometers

U. S. Pat. No. 1,135,727, April 13, 1915, U. S. Pat. No. 1,216,139, Feb. 13, 1917

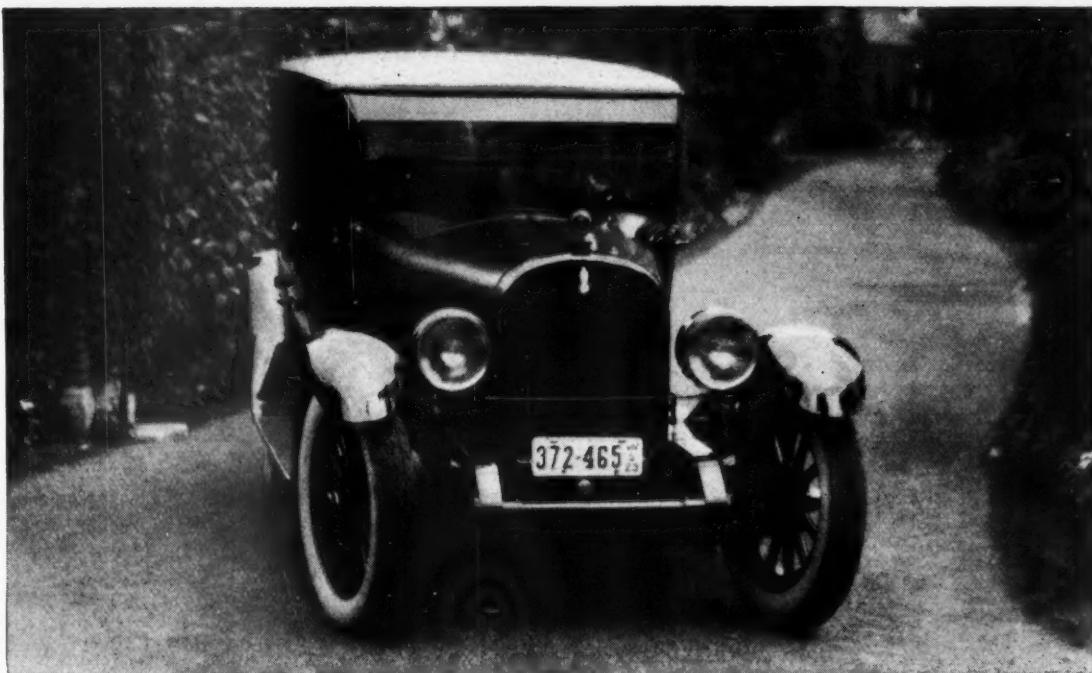
Other Patents Pending

The Standard
Spark Plug of
the World



The AC Speedometer—
Feature it as a Christmas gift
for the Ford or Star driver





How to Stay With the "Progressives"

YOU dealers who are handling a four or six of merit in the \$1000 or \$1500 class—what steps have you taken to reduce customer turnover?

The day of the "one car man" is over. People want a change. Those driving a four anticipate owning a six. Those owning just a six want a better six. It's the human urge. Prize customers, after a season or two, drift across the street or around the corner seeking the type of car they're after. Eventually they find it. A slap on the back and a friendly *good bye* handclasp is poor consolation for a sale lost.

True, you can't control the situation—but you can combat it. Complete your line

—add a car that will appeal to your "progressive" clientele. Your index of the sales you could have made will quickly find place on the list of sales you *do* make.

The Case line of better sixes—in two models and seven body types—offers you an unusual opportunity to achieve this objective. Because of their well-known ability and unfailing performance without petting and coaxing, Case motor cars are being bought every day by people who can afford to pay any price.

Dealers who get the facts soon share our confidence that with the Case line they can stop this unnecessary customer turnover and make many new friends as well.

J. I. CASE T. M. COMPANY, RACINE, WISCONSIN



CASE
MOTOR CARS



THE SIGN OF MECHANICAL EXCELLENCE



FOR MORE THAN EIGHTY YEARS



When is a 2-Ton Truck Not—?

WHEN BILL JONES loads *three* tons on it and hauls this excess load over all kinds of roads.

But if something breaks, does Bill take the blame? Of course not! He blames the truck—and you, the man who sold it to him.

That's why you have to be extra careful about the springs. Springs take the grief of the overload—more than any other unit.

There are springs—and Perfection Springs. Play safe, with "Perfection."

The EATON AXLE & SPRING COMPANY
PERFECTION SPRING DIVISION
CLEVELAND



PERFECTION SPRINGS

An EATON  PRODUCT

A Good Gas Gage for the Dash!

*Reliable, Inexpensive
Easy-to-Install*

*Universal Demand
Great Profits*



Read This—and Make Money!

Special Introductory Price to Dealers—With Money-Back Guarantee!

Here is the biggest opportunity you have had in years.

The "R-K-D" Dash Gasoline Gage tells, from the seat, how much gas is in the tank—makes it as easy to read the gas in the tank as the miles on the speedometer.

Just think how the "R-K-D" will sell!

In conjunction with the speedometer, the "R-K-D" also tells how many miles the motor is giving per gallon of gas, what gas is best, and how the motor is running.

Electrically operated. Absolutely reliable. Takes any gasoline feed. Easy to install—no fittings required, no service needed.

Active Demand Everywhere

The "R-K-D" retails for only \$9.50, complete—no price resistance. Liberal discounts to dealers. A fine profit in every sale.

13,000,000 motorists are waiting for this good Dash Gage.

National advertising campaign has begun. Advertising helps furnished free to dealers.

Act Quickly

An Opportunity in a Lifetime!

ACT QUICKLY, so you can familiarize yourself with this money-making opportunity, and be ready for the Christmas market. YOUR CHECK IS GOOD WITH US—or a money-order. And remember, we return your money if you are not completely satisfied with your sample gage.

Write today to

The Reiter-King-Dugan Company
Akron, Ohio.

Your Best Feature for Christmas

Make the "R-K-D" Dash Gas Gage the feature of your "Give Him Something for his Car for Christmas" campaign. People like to give new and novel things. The "R-K-D" will bring pleasure and satisfaction for the life of the car—and a big, quick, easy profit to you!

Check These Statements Yourself.

Here are some of the reasons why you can sell the "R-K-D" easily—sell lots of them, and make fine profits. Check these statements with your own knowledge and experience:

- 1—Closed cars make the old-fashioned tank gage more than ever out-of-date.
- 2—Trunk racks cover up the old-fashioned tank gage.
- 3—People are getting tired of running out of gas—thru depending on unreliable tank gages, or because someone "forgot to look." They are tired of that "uneasy feeling."
- 4—People are getting tired of expensive overflows at the filling station, of short measure, and arguments—of having to get out and watch.
- 5—People are getting tired of climbing out in all kinds of roads or weather, to wipe off a dusty, greasy gas-tank dial—and maybe light a match to see. They realize there is nothing about an automobile more important than the gas—that they ought to know about their gasoline all the time, and without any bother.
- 6—The "R-K-D" is in keeping with the present demand for convenience and refinement in motor car equipment. It is a compliment to any instrument board.

NO BIG STOCKS TO CARRY
Motor car manufacturers are fast adopting the "R-K-D" as original equipment.

The "R-K-D" can be furnished for practically all cars. Only one size and style—with floats to fit various size tanks. No big investment in space, stock or equipment. When ordering, merely state the name of the car on which you expect to install the gage, so proper floats can be included.

SPECIAL DEALER INTRODUCTORY PRICE WITH MONEY-BACK GUARANTEE

Cut the coupon and send it in today. It entitles you to the special one-time introductory dealer price of \$5.95, with money-back guarantee (for one sample gage only). It will be the best investment you ever made.

We make this unusual offer because we want you to put an "R-K-D" on your own car. We want you to see for yourself what a convenience and satisfaction it is.

The "R-K-D" Dash Gas Gage is so sound, so simple, and so reliable, that WE CONFIDENTLY STAND BEHIND IT WITH THIS SPECIAL INTRODUCTORY PRICE, AND THIS MONEY-BACK GUARANTEE. If the sample "R-K-D" is not everything we say it is—if, for any reason, you are not satisfied, send back the Gage, and we will return your money at once.

SO EASY TO SELL!

Would YOU have your ammeter down on your battery box? Or your oil-gage under the hood? Why, then, should you bother any longer with an old-fashioned tank gasoline gage? Why shouldn't you—and your customers—enjoy the safety, satisfaction, and convenience of always knowing, wherever you are, without any trouble or effort, just how much gas is in the tank?

Just send for an "R-K-D" and test it yourself. Then you will realize fully why the "R-K-D" is so easy to sell.

The Reiter-King-Dugan Co.,
Akron, Ohio.

Gentlemen:—Enclosed is \$5.95, for which kindly send me an "R-K-D" Gage, in accordance with your special sample offer with money-back guarantee. This "R-K-D" is for a

.....car, year.....model.....
Kindly also send me full information about your proposition to dealers. The name of my jobber is.....

Name

Street and No.

Town..... State.....

Warford adds the whole two-ton field to your live prospect list because the Warford-equipped Ford is a high-grade two-ton unit operating on a rock-bottom one-ton expense basis. Six forward speeds. OVERDRIVE slashes costs on light loads and return trips. UNDERDRIVE utilizes Ford stamina to overcome severest road and load handicaps, with phenomenal two-ton performance. Learn how you can extend your truck volume to new high totals from the two-ton market. Investigate this really mutual dealer proposition. Write.

AUBURN, N. Y.
Foster-Warford Co.
CANTON, Ohio
Dine-De Wees Company
400 Walnut Ave., S. E.
CHARLOTTE, N. C.
The Paul-Warford Co.
DALLAS
Houdaille-Polk Co.
2218 Commerce St.
DAVENPORT, Iowa
Sieg Company

DENVER, Motor
Specialties Company
17 W. 13th Avenue
MEMPHIS
Continental Body Co.
476 Union Ave.
MINNEAPOLIS
McGee White Corporation
1311 Hennepin Ave.
NEW YORK
Motive Parts Corporation
796 10th Ave.

SAN FRANCISCO
Warford-Pacific Co.
1111 Post Street
STOCKBRIDGE, Mich.
Transmission Sales Co.
VANCOUVER, B. C.
E. W. Jay
WICHITA, Kans.
Price Auto Service Co.
301 S. Topeka Ave.

The Warford Corporation, 44 Whitehall St., New York

Warford

AUXILIARY TRANSMISSION



read what a new user says about



Sav-Oil Ring Mfg. Co.,
1037 South Figueroa St.,
Los Angeles, California.

Gentlemen:
I have installed the Sav-Oil Rings you sent me, and I wish to thank you for the same, and to tell you I am very much pleased with them. I noticed immediately that they cut down the consumption of oil materially; and hereafter I intend to use them in all repair jobs where I possibly can.

I would also like to know whether you have any advertising matter or any mats or cuts that I could use in my advertising.

(Name on request)

Guaranteed
1000 miles
to the
Gallon of Oil

and he
ordered a
generous stock
from our
nearest
Distributors!

This is typical of the reports that we receive daily from garagemen and dealers who have given Sav-Oil oil rings a thorough test.

These wise service men, after convincing themselves of the value of Sav-Oils, are capitalizing their own personal experience to sell their customers. It isn't hard to do either. With our positive mileage guarantee squarely behind them, they know satisfaction is sure.

If you aren't one of them, it's time you were convinced. Order a set for some particular car that insists upon pumping oil. Install Sav-Oils and watch results.

Territories Open for Distributors

The Sav-Oil Ring Mfg. Co.

1037 So. Figueroa St.

Los Angeles

Sav-Oil Piston Ring Co.
2056 Jackson Blvd.
Chicago, Illinois

Sav-Oil Ring Mfg. Co.
550 Golden Gate Ave.
San Francisco, Cal.

H. C. Alexandria
612 W. Seventh St.
Little Rock, Ark.

H. W. Blevins
1532 Grand Ave.
Kansas City, Mo.

C. H. Mountjoy & Co.
211 Third Street
San Antonio, Texas

BUILT BY DURANT

Good Merchandising Demands a *balanced* line

Durant and Star Car Merchandisers have a rare opportunity that seldom is offered by any manufacturer. An ideally balanced line of four-cylinder cars, covering every class of open and closed jobs, enables the progressive merchandiser who has the Durant and Star selling franchise to concentrate on the biggest, richest and most profitable selling field.

Popular approval has firmly established these Durant products. The ideal balance of these lines, dovetailing together in open and closed jobs to cover the entire field in their classes, has been the means of making one line a profitable leader for the other.

Good merchandising demands a *balanced* line. Durant and Star Car lines are balanced—and they offer one of the few big opportunities in the industry. Backed by the Durant name, known throughout the world, they offer the progressive merchandiser a certain chance to reap the greatest harvest from his efforts. This is the sort of an opportunity we believe you will appreciate.

*Get in touch with the nearest
factory sales headquarters.*

DURANT MOTORS, INC.

ELIZABETH, N. J.

LANSING, MICH.

OAKLAND, CALIF.

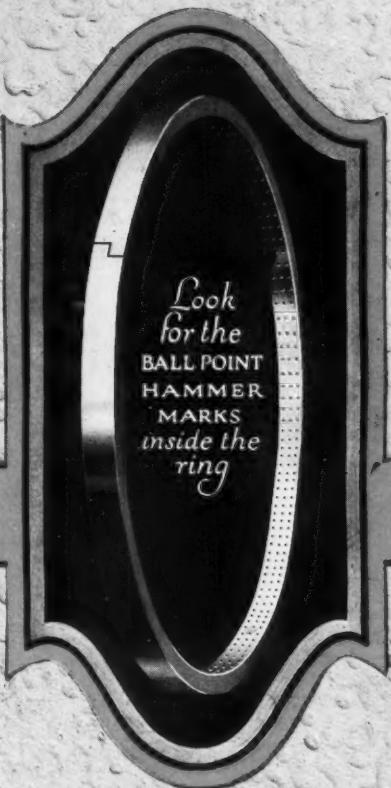
DURANT MOTORS OF CANADA, Ltd.

-- LEASIDE, ONT.

Of all the piston rings made in America-

You can count on your
fingers those makes which
are nationally distributed,
nationally known and
nationally used! ≈≈

Stock the right ring
Mr. Dealer and your
Battle's Half Won!



Look
for the
BALL POINT
HAMMER
MARKS
inside the
ring



Don't Bury Your Good Money

— in fancy ring stocks. The American Hammered Piston Ring is the easiest selling, most profitable and best known quality ring for you to concentrate on—we'll prove it to you!

First of all, this line is *complete* (one of the few) in every size and oversize—from the tiny ring for the small air compressor, through every motor car size, to the large ring for the huge Diesel Engines.

American Hammered rings have passed every conceivable test—in laboratory and in engine usage—in races, hill climbs and endurance tests! Ask us for the details!

Endorsed by leading engineers—installed by over two hundred motor car and engine builders—recommended by leading garage and repair men in every state. Ask us for the names.

Our distributor list reads like a selection of red letter leaders. You will find them in every jobbing center in every state—carrying American Hammered stocks as high as 25,000 rings.

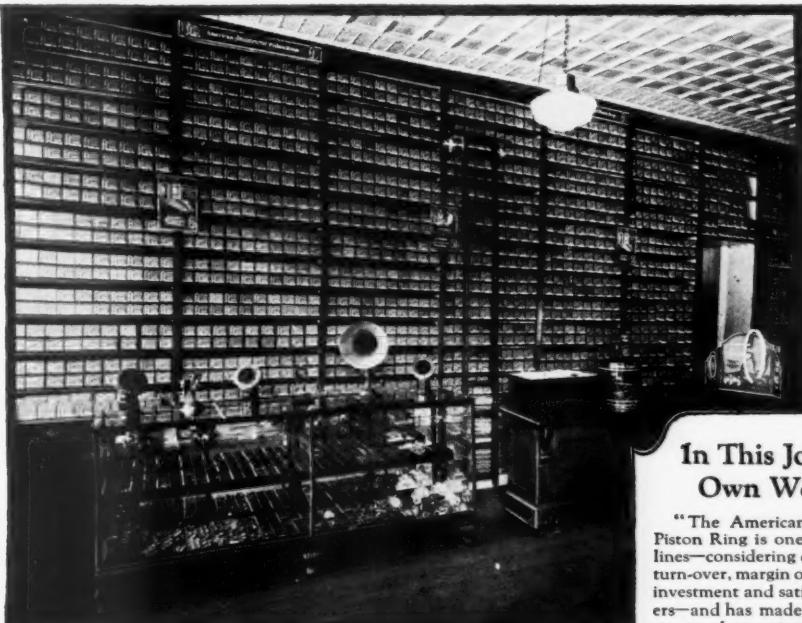
Three thousand service stations are carrying complete stocks, and, big or little, they are all making money on this product.

And if you want another thrill—read about the case of Allentown, Pa. on the next page . . .



American Hammered Piston Rings





This stock of American Hammered Piston Rings is completely turned over every sixty days.

In This Jobber's Own Words:

"The American Hammered Piston Ring is one of our best lines—considering quality, rapid turn-over, margin of profit, small investment and satisfied customers—and has made possible our constantly growing business.

"We feel especially privileged in being counted among those to represent you."

(Jobber's name upon request)

DO THEY SELL?
Take the case of Allentown, Pa. . . .

Here's a stock of 21,000 rings in a town of 73,000 population. (Pictured above.) This company sells 10,500 American Hammered rings every month to its dealers and service stations in and near Allentown! It has a complete turn-over of stock every 60 days—six times a year.

* * *

Scores of others handling American Hammered Piston Rings can tell you of similar success. It is the rule—nothing unusual.

Your own territory, whether east or west, large or small, offers a proportionate opportunity, if you are linked up with the *right* product.

If you are a responsible dealer and know a good thing when you see it, we don't need to say more. Write us today and let us advise you of the profit possibilities in your own case.

American Hammered Piston Ring Company
Baltimore, Maryland

Factory Stocks:

BALTIMORE
Bush and Hamburg Streets

CHICAGO
2133½ S. Michigan Avenue

SAN FRANCISCO
931 Larkin Street



**American
Hammered
Piston Rings**

Our Distributors and Their Branches Carrying Stocks:

Albany Hardware & Iron Company	Albany, N. Y.	Herring Motor Company	Des Moines, Iowa
Alexander-Seewald Company	Atlanta, Ga.	Hersh Hardware Co., Inc., F.	Allentown, Pa.
American Motor Equipment Company	Boston, Mass.	Hoff & Company, J. C.	Chicago, Ill.
American Sales Company	Baltimore, Md.	Horton-Gallo-Creamer Company	New Haven, Conn.
Andrea & Sons Company, Julius	Milwaukee, Wis.	Hunt & Company, J. R.	Baltimore, Md.
Auto Supply Company, Inc.	Nashville, Tenn.	Hutchinson & Company, T. T.	Wheeling, W. Va.
Automobile Supply Company, The	Chicago, Ill.	Inter-Mountain Electric Company	Salt Lake City, Utah
Ayers Farmer Auto Supply Company	St. Joseph, Mo.	"	Pocatello, Idaho
Bailey Co., The James	Portland, Me.	Interstate Hardware Company	Bristol, Va. Tenn.
Bailey-Lebby Company, The	Charleston, S. C.	Jackson, W. E. & W. H.	San Francisco, Cal.
Baker, Hamilton & Pacific Company	San Francisco, Cal.	Johnson Tire & Auto Company	Montgomery, Ala.
Ballou & Wright	Portland, Ore.	Johnstown Automobile Company, The	Johnstown, Pa. -
Ballou & Wright	Seattle, Wash.	Justus & Parker Company, The	Columbus, Ohio
Banta Company, The	Los Angeles, Calif.	Kansas City Automobile Supply Co.	Kansas City, Mo.
Bantin, Company, The Julius J.	Cincinnati, Ohio	Kelley-Haw-Thomson Company	Duluth, Minn.
Barber, Ross	Washington, D. C.	Kimball-Upton Company	Sacramento, Cal.
Barnett Hardware Co.	Altoona, Pa.	Ko-Mo Supply Company	Seattle, N. C.
Bee Automobile Company	Providence, R. I.	L. L. Moyer Company, Inc.	Sioux Falls, S. D.
Belcher & Loewe's Hardware Company	Louisville, Ky.	Lansing Brothers, Inc.	Scranton, Pa.
Belknap & Hdw. & Mfg. Co.	Richmond, Va.	Lowe Motor Supplies Company, Inc.	New York, N. Y.
Benton-Bailey Co., Inc.	Boise, Idaho	M. & M. Company, The	Cleveland, Ohio
Bertram Motor Supply Co.	Waco, Texas	"	Akron, Ohio
Bethel Auto Supply Company	Bangor, Me.	Mackenzie, White & Dunsmaur, Ltd.	Youngstown, Ohio
Brass & Sonner Company	Grand Rapids, Mich.	Martin-Evans Company	Vancouver, B. C.
California Auto Supply Co.	Stockton, Calif.	Meadows-Price Company, Inc.	Brooklyn, N. Y.
Cameron & Barkley Company	Charleston, S. C.	Merrick & Company, The C. S.	Roanoke, Va.
Canton Hardware Company	Canton, Ohio	Meyer Company, Jos. F.	New Haven, Conn.
Cedar Rapids Auto Supply Company	Cedar Rapids, Iowa	Michigan Automotive Supply Company	Houston, Texas
Chandler & Lyon Company	San Francisco, Cal.	Miller Hardware Company, C. H.	Detroit, Mich.
"	Fresno, Cal.	Mills-Morris Company, The	Huntingdon, Pa.
"	Los Angeles, Calif.	Minneapolis Iron Store Company	Memphis, Tenn.
"	Oakland, Cal.	Montana Hardware Company	Minneapolis, Minn.
"	Portland, Ore.	Moore-Handley Hardware Company	Butte, Mont.
"	Seattle, Wash.	Morley-Murphy Hdw. Company	Birmingham, Ala.
"	Spokane, Wash.	Motor Equipment Company	Green Bay, Wis.
"	Tacoma, Wash.	Motor Hardware & Equipment Co.	Wichita, Kansas
"	Eau Claire, Wis.	Motor Mercantile Company	San Diego, Cal.
Clemens Auto Supply Company	Jacksonville, Fla.	Motor Supply Company	Salt Lake City, Utah
Consolidated Grocery Company	St. Paul, Minn.	Myers, Harper F.	Chattanooga, Tenn.
Copper Rubber Co., The L. J.	Dayton, Ohio	McClung Company, C. M.	Knoxville, Tenn.
"	Indianapolis, Ind.	McClung Motor Supply Company	San Francisco, Cal.
"	Knoxville, Tenn.	McGowin-Lyon Hdw. & Supply Co.	Los Angeles, Cal.
"	Little Rock, Ark.	McLendon Hardware Co.	Mobile, Ala.
Couden Co., O. W.	Detroit, Mich.	Nicols, Dean & Gregg	Waco, Texas
Crow-Burlingame Company	Flint, Mich.	Norris & Sons, R. W.	St. Paul, Minn.
Cumings Brothers	Peoria, Ill.	Northwestern Auto Supply Co., Inc.	Baltimore, Md.
Cumings Brothers	Peoria, Ill.	Odell Hardware Company	Billings, Mont.
Cummings & Emerson	Shreveport, La.	Olmsted Company, Inc., The	Greensboro, N. C.
Cupples-Lonergan Company, Inc.	Auburn, Me.	Patrick's, Inc.	Syracuse, N. Y.
Darling Automobile Company	New York, N. Y.	Pearle-Gaibert Company, Inc.	Jacksonville, Fla.
Dienst Co., Inc., A. P.	Canton, Ohio	Pegau Company, E. A.	Louisville, Ky.
Dine-DeWees Company, The	Springfield, Mass.	Pittsburgh Auto Equipment Company	Omaha, Nebr.
Duffey-Rolfe Co., Inc.	Duluth, Minn.	Pruden Hardware Company, W. E.	Pittsburgh, Pa.
Duluth Auto Supply Co.	Francisco, Cal.	"	New York, N. Y.
Dudson, Cargill & Hulson Co.	Hastings, Neb.	Rawson-Uphaw Company	Nowark, N. J.
Dutton & Sons Company, W. M.	Pittsburgh, Pa.	Reinhardt-Borders Company, Inc.	Atlanta, Ga.
Dyke Motor Supply Company	Newark, N. J.	Roverdink & Son, W. H.	Minneapolis, Minn.
Economy Auto Supply Company	Dallas, Texas	Rubel & Company, Inc., Chas.	Washington, D. C.
Electric Appliance Co. of Dallas	Chicago, Ill.	Russell Hardware Company, Inc.	McAlester, Okla.
Electric Appliance Company	Elmira, N. Y.	Severin & Company	Tulsa, Okla.
Elmira Arms Company	Huntington, W. Va.	Severin Tire & Supply Company	Oklahoma City, Okla.
Emmons-Hawkins Hardware Company	Hartford, Conn.	Shadolt & Boyd Iron Company	Milwaukee, Wis.
Ensorworth & Son, L. L.	Dubuque, Iowa	Sligo Iron Store Company	St. Louis, Mo.
Ersdorf Iron Company, John	Portland, Me.	Sorber-Kuhn Auto Supply Co.	Memphis, Tenn.
Farrar-Brown Co., Inc., The	Los Angeles, Cal.	Southern Auto Supply Company	Chattanooga, Tenn.
Featherstone, E. A.	Bluefield, W. Va.	Stadler Auto Supply Company	Houston, Texas
Flat Top Auto Supply Co.	Fort Smith, Ark.	Standard Supply & Equipment Co.	Philadelphia, Pa.
Fort Smith Automotive Supply Co.	Fort Wayne, Ind.	Stauffer, Eshleman & Company, Ltd.	Trenton, N. J.
Fort Wayne Iron Store Company	Columbia, S. C.	Straus-Frank Company	New Orleans, La.
Fowler-Anderson Company	Pittsburgh, Pa.	Straus Company, Inc., Joseph	San Antonio, Texas
Frampton Company, The	Lancaster, Pa.	Supplee-Biddle Hardware Company	Buffalo, N. Y.
Frank & Company, Inc., C. D.	Altoona, Pa.	Sweeney Electrical Company, The B. K.	Philadelphia, Pa.
Front Market Motor Supply Company	Charleston, S. C.	Thomson-Diggs Company, The	Denver, Colo.
Gaul, Derr & Shearer Company	Harrisburg, Pa.	Toledo Rubber Company, The	Sacramento, Cal.
General Automotive Supply Company	Philadelphia, Pa.	Turner Auto Supply Company	Toledo, Ohio
"	Harrisburg, Pa.	United States Rubber Company	Alexarkana, Texas
General Motor Supply Company	Lancaster, Pa.	"	Chicago, Ill.
General Sales Company	Altoona, Pa.	"	Boston, Mass.
Goodby-Bankin Company	Providence, R. I.	"	Buffalo, N. Y.
Goodlin Automotive Equipment Co.	South Bend, Ind.	"	Des Moines, Iowa
Hausam Co., R. J.	Sedalia, Mo.	"	Erie, Pa.
Hendrie & Bothoff Mfg. & Supply Co.	Denver, Col.	"	Green Bay, Wis.
Herrick Hardware Co.	Waco, Texas	"	Rochester, N. Y.
		Utica Cycle & Supply Company	Syracuse, N. Y.
		Van Zandt-Lefwich Auto Supply Co.	Utica, N. Y.
		Waterhouse & Lester	Huntington, W. Va.
		Walnstock Nichols Company	San Francisco, Cal.
		"	Oakland, Cal.
		Western Motor Supply Co.	Minneapolis, Minn.
		Wetmore-Savate Company	Boston, Mass.
		"	Springfield, Mass.
		Whittemore Sim Co., Inc.	New York, N. Y.
		Williams Hardware Co.	Minneapolis, Minn.
		Wilson Hdw. Co., E. L.	Beaumont, Texas
		Wholesale Auto Supply House of Tampa	Tampa, Fla.
		Woodring & Company, Jere	Hazleton, Pa.
		Woodwell Company, Joseph	Pittsburgh, Pa.

**American
Hammered
Piston Rings**

Look
for the
BALL POINT
HAMMER
MARKS
inside the
ring



**Be on
Guard**



Mr. Dealer!
You Need a Big Stock of the

Eveready

CLEAR VISION-AVOID COLLISION

**AUTOMATIC
WINDSHIELD CLEANER**

for the Xmas trade. Hundreds of thousands will be sold. A big National advertising campaign in the metropolitan newspapers is reminding the Xmas shopper of the "ideal gift for the car."

Every Eveready dealer is furnished with specially prepared letters which carry his name. These letters are directed to his trade. Beautiful ads are also furnished for dealers to run in their local papers.

The Eveready comes packed neatly in an individual carton together with plenty of holly paper in which to wrap it—beautiful Xmas cards and stickers are also furnished. Think of it! All this service absolutely free.

Write us today—get all the facts—and DON'T neglect it, because dealers are going to make more real money on the Eveready than on any other item this Xmas. Order from your jobber or send us YOUR order today.

APEX ELECTRIC MFG. CO.
1410 West 59th St. Chicago



To Those Who This Message

One opens the morning paper—a "dark horse" is a millionaire. A man, yesterday unknown, appointed to a position of trust. A President—a boy of the farm a few years ago. And so the story goes, while the people look on in wonderment.

Magic! Luck! Mystery! Rarely any of these! For every man who succeeds because of any one of the three—a thousand arrive by reason of hard work, vision and judgment. There is no mystery about success — nor is there a standard formula. The opportunity is open to every one.

The Auburn Automobile Company, long ago, established policies that have stood during these years, while others have changed. And at no time in the Automotive Industry has Auburn offered greater advantages to merchants than today!

"No man builds for future sales,

Are Looking Ahead Is Important!

Auburn's first thought has been to give a good product to the buyer. Second, the satisfaction he would derive from it. Third, profit for the distributor and dealer. Fourth, full protection to them both. Fifth, intensive co-operation in the resale of Auburns. Sixth, to reserve a fair profit for itself. And so, each year has been a better one for Auburn and the demand for its franchise is increasing!

Far-sighted men of vision and action have been quick to take the Auburn Franchise. And to those men who want something of great value; who desire a substantial profit and a sound business; who are looking to the future as well as the present; who are located in centers in which we are not now established, we have a definite proposition to make—write or wire

AUBURN AUTOMOBILE COMPANY
AUBURN, INDIANA

more than—he who sells an Auburn”



*One Catalog with
the Selling Power
of
1000 SALESMEN!*

HOW long would it take a personal salesman, calling on you in your store, to give you all the facts about a full range of 10 tires and 4 tubes, designed to meet every dealer's needs?

Think how many salesmen it would take to repeat the same story to more than 18,000 dealers all over the country.

Yet, that is exactly what every issue of the "Better Tires" Wholesale Catalog does.

Each edition brings to our 18,000 dealers a line of highest quality tires, tubes and accessories at prices that offer real opportunities for quick sales and good profits. *Our economy in distribution* is reflected in our lower wholesale prices on every item.

The "Better Tires" Catalog offers the dealer a greater range of choice than he could possibly secure from any other one single source.

Moreover, in each Catalog we offer the dealer a series of complete, definite, tested merchandising plans that will positively help him sell tires.

Our method of wholesaling brings unequalled advantages to the dealer who makes the "Better Tires" Catalog his source of supply.

Your copy of this interesting 150-page book is ready—a request on your business letterhead will bring it by return mail.

**The Better Tires Company
WHOLESALE ONLY**
Michigan Avenue & 18th Street, Chicago

The Better Tires Company
The House that Helps the Dealer Sell

CHICAGO, U.S.A.



*Comfort at
Your
Command*

The New *Stewart* Shock Absorber



The Little Red Wrench

This handy little tool furnished free with every set of Stewart Shock Absorbers. Its bright color makes it easy to pick out of tool box. No fussing around to find a wrench to fit the adjusting nut.

Stewart Shock Absorber

PRICES

Set of four, with wrench	:\$30.00
Set of two, with wrench	:\$15.00
(Western prices—\$31.00 and \$15.50)	

What Dealers Should Know About It

ITS big feature—a quick, easy adjustment—tension can be tightened or loosened for various car weights. Car owner can adjust it himself, if he wishes, to give the degree of riding ease he desires. Adjustment made by slight turn with the red wrench of exterior adjusting nut. Not necessary to disconnect strap or anything else.

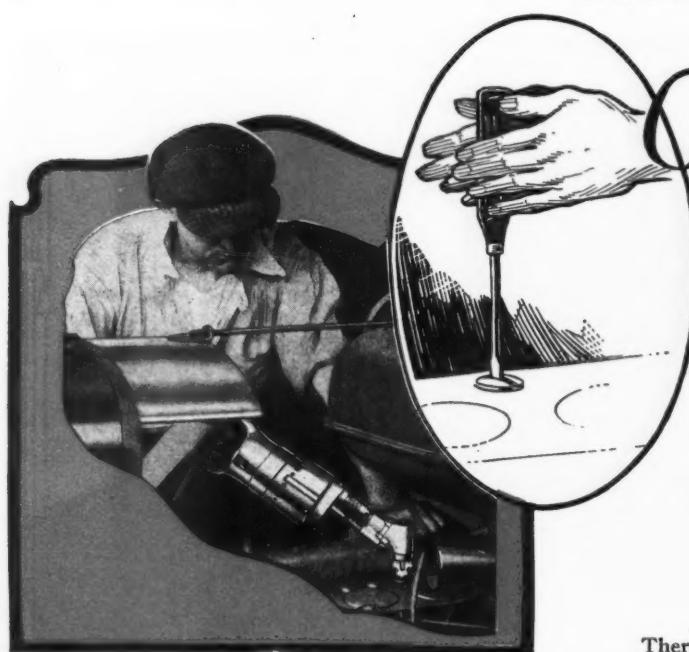
Easy installation. Two front and two rear channel fittings accommodate most popular standard cars. No need to stock big variety of models.

Two discs against spring drum give maximum friction surface, smoothly absorbing shocks without jerking.

Strap is of heavy webbing, specially treated to resist wear and weather.

STEWART-WARNER SPEEDOMETER CORPORATION
CHICAGO - U.S.A.

Stewart
CUSTOMBILT ACCESSORIES
USED ON 8 MILLION CARS



The only correct principle of valve "lapping"



Revolves, as it Oscillates, as it Grinds!



There is only one correct principle of valve lapping—the combined revolving and oscillating motion used when a valve is "lapped in" by hand. This same principle is used in the Petersen Guaranteed Electric Valve Grinder. *It is the only electric valve grinder with this double action movement.* Results obtained with this machine are as good as can be had from the very finest hand work. But the time required is a mere fraction of that required by hand. *After a few jobs the machine has easily paid for itself.*

Notice particularly the angle offset spindle which makes all valves easy to get at, even though they are located under a gas tank (as illustrated above) or back under the cowl. The machine operates at a slow speed compared with most electric tools to prevent chattering the valve, running grooves in the valve seat, throwing the compound off the seat, or jumping the blade out of the slot or holes. A helper can do expert work.

THE PETERSEN LINE IS COMPLETE

Write for a miniature catalog and the name of the jobber in your vicinity who carries the full line of Petersen Guaranteed Electric Tools, *which is complete for the garage trade.* We will arrange for a demonstration in your own shop.

A. H. PETERSEN MFG. CO.
1616 FRATNEY ST.
MILWAUKEE
WIS.

PETERSEN

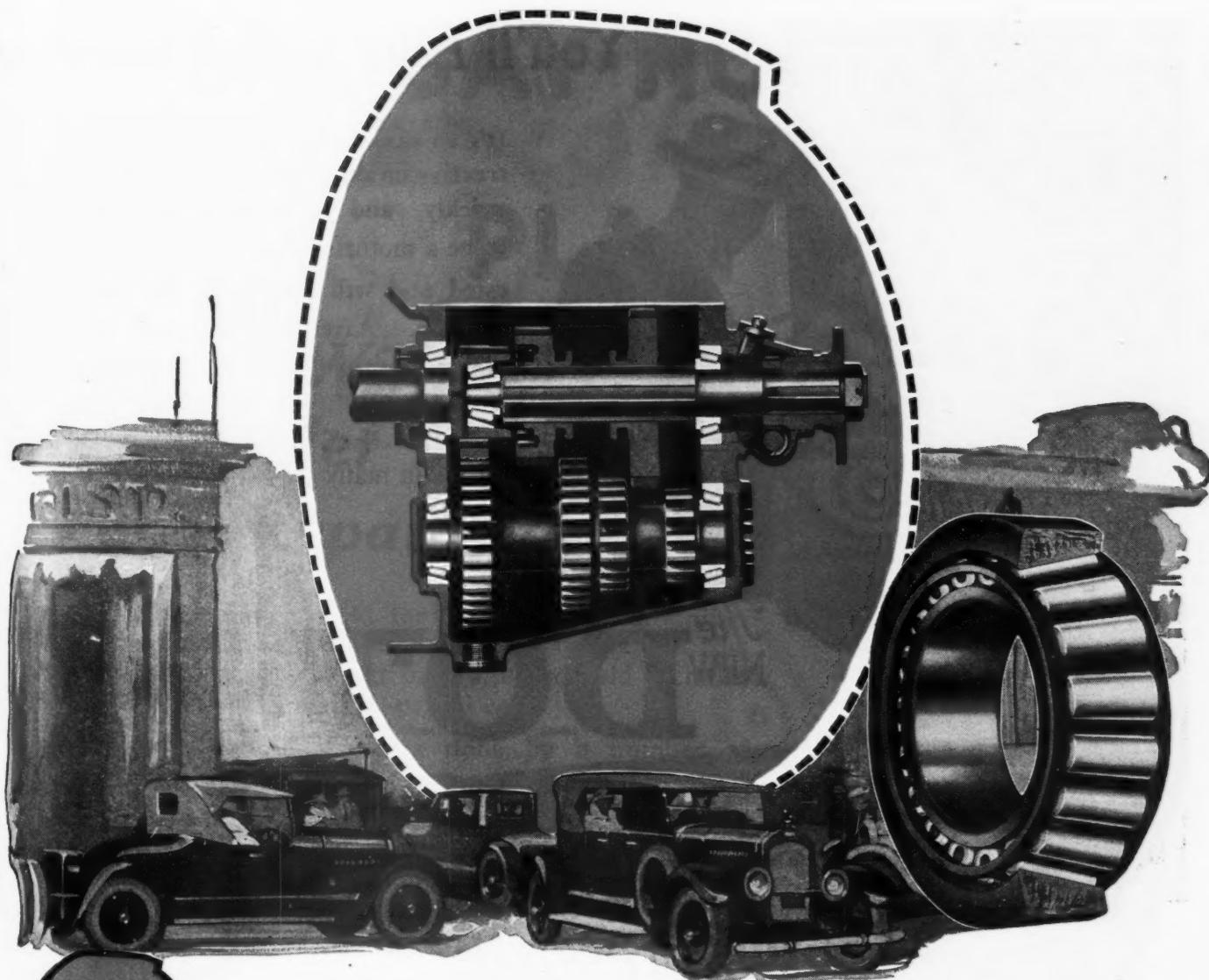
Guaranteed

DOUBLE ACTION VALVE GRINDER

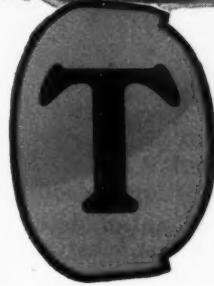
GUARANTEED IN WRITING
FOR ONE YEAR

\$45
110 VOLT





Matching the Requirements



We'll
Fight
Friction
for you
Everywhere

THE TIMKEN ROLLER BEARING
SERVICE & SALES COMPANY
CANTON, OHIO

BRANCHES:
Atlanta
Baltimore
Birmingham
Boston
Brooklyn
Chicago
Cleveland
Dallas
Denver
Detroit
Florida
Indianapolis
Kansas City
Los Angeles
Milwaukee
Minneapolis
Newark
New Orleans
New York
Oklahoma City
Philadelphia
Pittsburgh
Portland
Richmond
St. Louis
San Antonio
San Diego
San Francisco
Seattle
Tampa
Winnipeg

Distributors Everywhere

©1923, By The T R B Co, Canton, O

largely resolved itself into obtaining stubby shafts for rigidity, and for the more compact, less resonant housings thus permitted. These are the very things so readily achieved through the use of Timkens; since Timkens carry more load per unit of space required.

Load Carrying—Transmissions offer a particularly trying complication of heavy radial, thrust, and resultant loads, and shock loads, at high speeds. To care for this situation with economical, effective design requires the inherent Timken ability to carry *all* loads simultaneously, at *all* speeds.

Silence—Basically transmission silence has

largely resolved itself into obtaining stubby shafts for rigidity, and for the more compact, less resonant housings thus permitted. These are the very things so readily achieved through the use of Timkens; since Timkens carry more load per unit of space required.

Alignment—The simplicity of Timken mountings is an assurance of greater precision and more speed in assembly, and finally—

Timken Adjustability—for the wear that must follow motion perpetuates the original excellence of a transmission design.

The Timken Roller Bearing Co
CANTON, OHIO

TIMKEN

Tapered

ROLLER BEARINGS

69 manufacturers of cars and trucks have already adopted the DOT. Dealers will enjoy the steady trade of the owners of all these cars and trucks when they offer them

DOT SERVICE

The DOT Lubricator is thoroughly protected by allowed claims of pending patent applications.

It's so easy to demonstrate, so attractive on display and it can be so quickly and clearly explained. Once a motorist sees it he is interested and will ask for a demonstration. After that the sale is easy. A demonstration convinces your customer and closes the sale. The Dot is a "self seller" that brings in many new customers.

If you are a manufacturer, jobber or dealer in automobiles and accessories, you are also a motorist. You know just what appeals to you as a motorist.

Look at the DOT closely. Examine the rigid, direct connection, the leak-proof, automatic valve, the one-piece steel nipples that bring every lubricating point within easy reach, the perfection of workmanship and beauty of finish. Consider the tremendous pressure, progressively developed from one to three thousand pounds. (Prove this on the pressure gauge) then think of the time saved—13 minutes to lubricate the entire chassis—and the ease and cleanliness of the job when you can operate the gun with one hand

without awkward stretching, without muss or ruined clothing.

These are the things that appeal to you as a motorist. They also appeal to your customers. That is why you will like to sell the DOT. You will like to show it and demonstrate it to your customers and you will enjoy the ever-increasing trade from the satisfied customers you sell.

As a manufacturer, dealer, or motorist, you will be interested in the demonstration of the DOT. Send us a card for full particulars.

Made only by

CARR FASTENER COMPANY

31 Ames Street

Cambridge, Mass.

"Makers of the 'Dot' line of Fasteners"

Branches—40 Seldon Ave., Detroit; 47 W. 34th St., New York; Monadnock Bldg., San Francisco; Gage Ave. & Beach Rd., Hamilton, Ont.

The New McQUAY-NORRIS MOTOR RE-CONDITIONING PLAN

Opens a Wider Market for Cylinder Regrinders and Repair Shops

There is a tremendous field for Motor Re-conditioning. Cars of all prices and grades are possible prospects for this work and the profits which it brings. The field includes low-priced cars as well as high-priced cars.

Motor Re-conditioning is being done by a number of methods.

They include—

Regrinding
Reaming

Lapping
Reboring

Honing
Burnishing

Each one of these processes has its particular advantages and talking points. Each has its supporters.

Cylinder regrinders can make bigger profits under the McQuay-Norris Motor Re-conditioning Plan than ever before. Many of them are already using two processes. If the car has a small cash value left in it, they are using a tool and process which permits re-conditioning in the frame. When a machine that still represents a large cash value to its owner is being "overhauled" they remove the block from the frame and use their bigger tools.

They are adapting the process to the car owner's pocketbook. They are Re-conditioning his motor by the less expensive process when his car value and pocketbook make this desirable and using the more expensive process when car value and pocketbook make it practical. They are following the same merchandising principles which are general in all business—adapting product to the customer's pocketbook. But whichever process they use, the customer gets a fixed price in advance and the Repairman makes a definite profit. That is the big thought which underlies Motor Re-conditioning. And the field is over 13,000,000 automobiles.



How cylinder regrinders can adapt the McQuay-Norris Motor Re-conditioning Plan to their business is explained in the booklet. Send for it and read it carefully. It has a profit message for you. Address Dept. M.



This outside sign spots your shop as a station for this new service. Car owners will look for it. Ask your jobber's salesman or write us direct.

MCQUAY-NORRIS MANUFACTURING COMPANY

General Offices, St. Louis, U. S. A.

Factories: St. Louis, Indianapolis, Connersville, Ind., Toronto, Canada

REPUBLIC

yellow chassis

trucks

VETERINARIES
USE THEM

LAUNDRIES
USE THEM

CIRCUSES
USE THEM

PAINTERS
USE THEM

FARMERS
USE THEM

FISHERIES
USE THEM

EVERYONE
USES THEM

ELEVATORS
USE THEM

BINDERIES
USE THEM

CATERERS
USE THEM

SILK MILLS
USE THEM

LIBRARIES
USE THEM

SURVEYORS
USE THEM

CEMETERIES
USE THEM

BILLPOSTERS
USE THEM

STOCKYARDS
USE THEM

CLEANERS
USE THEM

FLORISTS
USE THEM

FLOUR MILLS
USE THEM

EXCAVATORS
USE THEM

BOTTLERS
USE THEM

COTTON MILLS
USE THEM

THE truck sales field has always known Republic factory support as unrivaled. Now the heavily backed, virile Republic organization, commanded by experienced Republic personnel, is better than ever situated for thorough co-operation with every Republic dealer.

The truck buying public has always known every Republic truck as a distinct overvalue. Continuous refinement now actually betters Republic trucks in power, economy and length of life.

This splendid product, under the impetus of

RIES
M
RESTAURANTS
USE THEM

PLASTERERS
USE THEM

MASONS
USE THEM

ALL LINES
USE THEM

CHANDLERS
USE THEM

DRILLERS
USE THEM

TANNERS
USE THEM

WRECKERS
USE THEM

BUTCHERS
USE THEM

NURSERIES
USE THEM

CLOTHIERS
USE THEM

BUILDERS
USE THEM

BAKERS
USE THEM

POLICE
USE THEM

PLUMBERS
USE THEM

HOISTERS
USE THEM

WAREHOUSES
USE THEM

PAPERS
USE THEM

FOUNDRIES
USE THEM

PRINTERS
USE THEM

GROCERS
USE THEM

QUARRIES
USE THEM

present impregnable Republic resources, is making strides. Republic has more trucks in use than any other exclusive truck maker, and the margin fast increases.

Republic trucks are used everywhere in every business field. National use and national repute—assets which only a few trucks offer—are bulwarks for every Republic dealer.

Every element your business success demands is in the Republic franchise. You should have the facts.

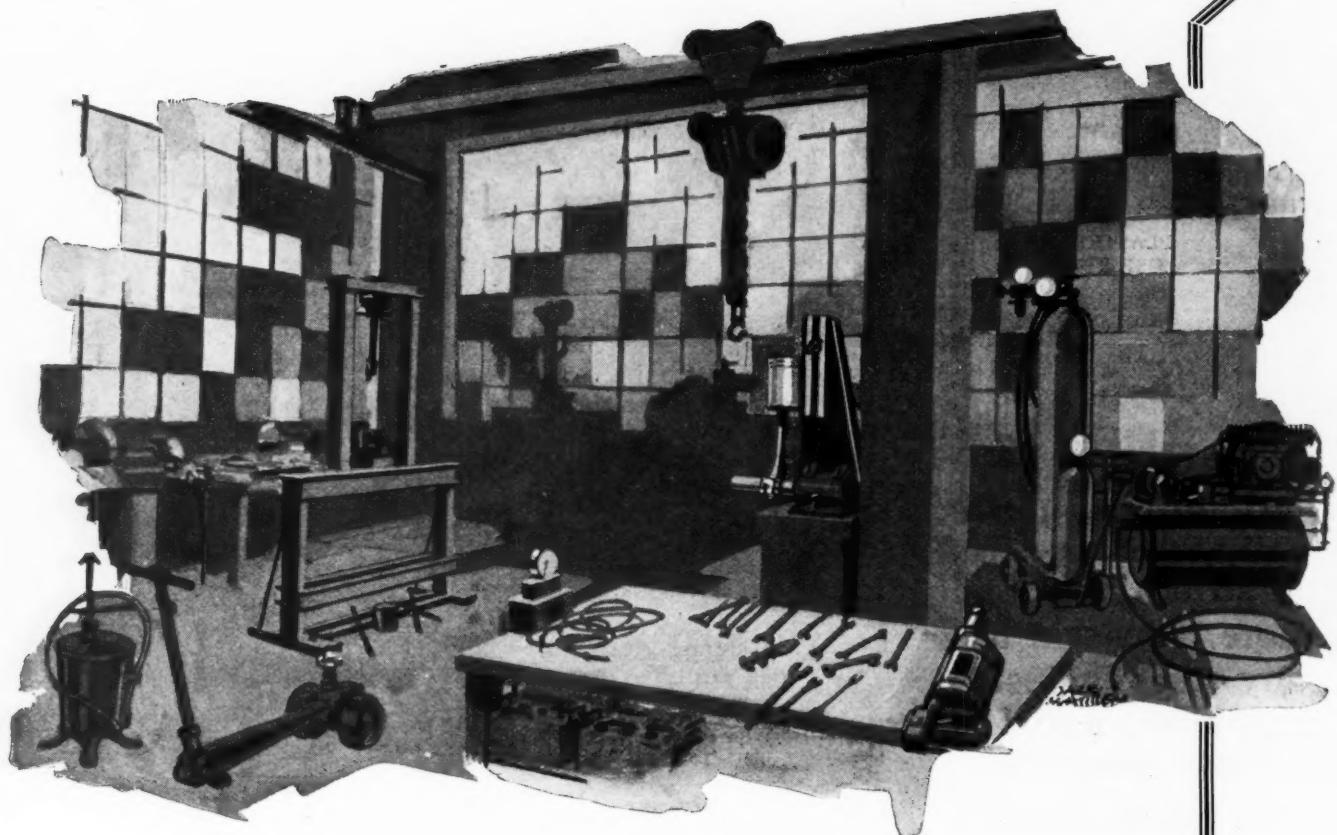
REPUBLIC MOTOR TRUCK CO., INC.

*More Trucks in Use than any other
Exclusive Truck Builder*

Alma, Michigan



We are glad to say that we are quite satisfied with the Republic trucks we are using. We commenced using them about six years ago and at present are operating a fleet of about sixty-five Republic trucks. We find them simple in construction, easy to operate and in every respect satisfactory. — *Metropolitan Laundry Company, San Francisco, Calif.*



National Overhauling Month

November 1st to 30th, 1923

AFTER the hard continuous usage of the Summer months nine out of ten cars require overhauling.

When the inclement weather comes the car should be in perfect condition, for it is then that the cold weather makes starting difficult, and, if this is made worse by low compression due to leaky rings and valves, the battery suffers. A greater percentage of transmission and rear end troubles occur in Winter because of the additional strain incurred traveling snow rutted roads and bucking drifts. For this reason all engine, transmission and rear end bearings should be snug, all gears meshed up properly and play eliminated from steering knuckles.

SELL SERVICE. National Overhauling Month offers an ex-

ceptional opportunity for you, MR. DEALER, to exert your salesmanship for the mutual benefit of your customers and your pocketbook.

Urge your customers to prevent troubles resulting from dilution of crankcase oil and hard starting by reconditioning cylinders and grinding valves. Urge them to avoid trouble by getting those loose bearings taken up and by overhauling rear end and transmission which has extra heavy work to perform during the Winter.

BE SURE YOUR OWN SHOP IS EQUIPPED TO DO THIS WORK WELL AND ECONOMICALLY, BECAUSE, AFTER ALL

The Best Equipped Shop Gets the Business



Names Every Shopman Should Know

ANY of the manufacturers listed below will help you in the selection of equipment best suited to conditions in your shop without obligating you in any way.

T. R. Almond Mfg. Co. Ashburnham, Mass.

Drill Chucks
Lathe Chucks
Micrometers, Outside
Micrometers, Inside, for
Cylinder Measurements

Wood-Imes Mfg. Co. Minneapolis, Minn.

Wood-Imes Dolly Jacks
Tire Changing Jacks
Adjustable Garage Horses
Garage Cranes and Ambulances
Burnishing Machines and
Burnishing Compounds

Wright Mfg. Co. Lisbon, Ohio

Wright High-Speed Chain
Hoists
Standard Screw Chain Hoists
Differential Chain Hoists
Steel Trolleys for Overhead
Track Systems
Hand Traveling Cranes

Weidenhoff Products 4352-58 W. Roosevelt Rd. Chicago, Ill.

Electrical Testing Devices
Test Benches
Battery Dischargers
Growlers
Magnetizers
Variable Speed Motors
Generating Holding Vises and
Driving Chucks
Mica Undercutters

The Manley Mfg. Co. York, Pa.

Cranes—Wrecking and Floor
Presses—Garage and Arbor
Auto Hoists, Garage Lights
Garage and Service Jacks
Towing Trucks
Engine and Axle Stands
Portable Benches
Portable Tool Trays
Air and Water Stations
Truck Wheel Handler
Chassis Underworker

This advertisement is published and
paid for by the concerns listed above
who are pioneers in the development
of time and labor-saving equipment
for automotive service work.

Bonney Forge & Tool Works

Allentown, Pa.

Original Chrome-Vanadium
Drop Forged Wrenches
Original Chrome-Vanadium
Valve Tappet Wrenches
Carbon Steel Drop Forged
Wrenches of all kinds
Stillson Pipe Wrenches
Adjustable Wrenches
Combination Wrenches
Garage and Small Vises
Battery and Grease Cup Pliers
Body Iron Assortments
Special Automobile Tools
Drop Forgings

Van Norman Machine Tool Co.

Springfield, Mass.

Valve Grinding Machines
Piston Grinding Machines
Milling Machines
Internal Grinders
Ball-Raceway Grinders
Bench Lathes

Continental Auto Parts Company

Columbus, Ind.

Motor Overhauling, Radiator
and Axle Stands
Piston Vises, Gear Pullers
Creepers
Wrecking Trucks
Straightening Presses
Piston Aligning Devices
Burning-in Machines

Frank Mossberg Company

Lamb St.
Attleboro, Mass.

Wrenchsmiths for 20 Years

Solid Socket Wrenches
"Tee" Handles
Speeders, "Swivel Joint"
"Tee" Handles and Speeders
Special Wrenches and Tools
for Fords
Miscellaneous Automobile
Tools
Socket Wrench Sets and
Accessories
Engineers' Wrenches
Adjustable Wrenches
Metal Stampings

Stevens & Company 375 Broadway

New York

Stevens "SPEED-UP" Tools

Engine Timing Tester
Piston Aligner
Microguage
95 Special Tools for Fords and
Fordson
Spiral Reamers
Valve Reseaters and Refacers
Sectional Shop Cabinets

The Burton-Rogers Company

755 Boylston Street
Boston, Mass.

Hoyt Electrical Instruments
Ammeters
Volt Meters
Rotary Meters
Growler Sets
Magneto Testers
Cadmium Meters
Cell Meters
Mohawk Rectifiers

Weaver Mfg. Co. Springfield, Ill.

Auto Hoists, Axle Stands
Auto Ambulances and Cranes
Towing Poles
Garage Jacks
Garage Presses
Tire Changers and Spreaders
Wire Wheel Repair Stands
Bucket Pumps
Oil and Gasoline Cans
Alignment Indicators

Kellogg Manufacturing Company

Rochester, N. Y.

Kellogg Electric Motor Driven
Garage Compressors
Kellogg Air Towers
Kellogg Valves
Kellogg Gauges

The Jacobs Mfg. Co. Hartford, Conn.

Drill Chucks

Oxweld Acetylene Co. Newark, Chicago, San Francisco

Oxy-Acetylene Apparatus and
Supplies
Ever-Ready Welding, Cutting
and Lead-Burning Outfits

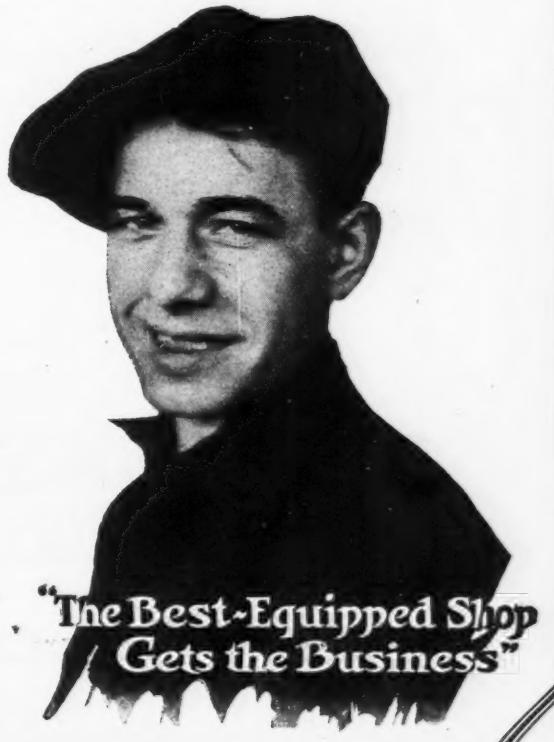
The Black & Decker Mfg. Co.

Baltimore, Md.

Portable Electric Drills
Electric Air Compressors
Electric Portable and Bench
Grinders
Electric Valve Grinders
Bench Drill Stands

Brunner Mfg. Co. Utica, N. Y.

Air Compressors
Air Tanks
Air Hose
Air Valves
Automatic Pressure
Controllers



"The Best-Equipped Shop
Gets the Business"

**SERVICE EQUIPMENT
ASSOCIATES**

Patent Rights of Keystone Initial Radiator Caps Upheld

After litigation of more than eighteen months, an Official Decision rendered by THE EXAMINER OF INTERFENCES of the United States Patent Office, Washington, D.C. upholds Keystone priority of patent rights for the design of Radiator Caps over that of the so-called Monogram Cap; manufactured by Miller & Pardee, Inc.

The findings of the United States Patent Office are summarized in the last two paragraphs of the Decision which read as follows:

"For the reasons above given it is concluded that the Senior party [Suporter, Pardee and Dewire, alleged inventors of Monogram Radiator Cap] derived the basic idea underlying the design in issue from Hoffberg [inventor of Keystone Radiator Cap] through Suporter and that accordingly as to anything common to the designs disclosed by the several parties, the Senior party is not an original inventor. It is concluded further that even if Pardee, et al. are assumed to be original inventors, they cannot prevail, for Hoffberg has established by numerous credible witnesses that he completed his invention on a date prior to the earliest date set up by Pardee, et al.

Priority of invention of the subject matter in issue is hereby awarded Louis Hoffberg, the Junior party."

Note: Phrases in brackets are merely explanatory and are not part of decision.

News of this Decision will be welcomed by jobbers and dealers who have been long confused by a multitude of conflicting claims made by various manufacturers of radiator caps of this design.

We take this occasion to thank our friends in the trade for their loyalty and support during this litigation.



PRESIDENT
The NORLIPP COMPANY
568 W. Congress St., Chicago



and Original
RADIATOR CAP
With INITIALS, MONOGRAMS
and EMBLEMS

Objections which have been made—either justly or unjustly—to mechanical four wheel brakes, do not apply to hydraulic four wheel brakes.

It has been asserted, for instance, that the only two claims made for four wheel brakes are, that they permit quicker stopping and prevent skidding.

Beside accomplishing these two vitally important results, Lockheed Hydraulic Four Wheel Brakes also—

Require practically no adjustment, being from the very nature of the hydraulic principle always perfectly equalized. (At very long intervals it is necessary to "take up" on the brake bands because of wear on the brake lining.)

Because pressure is always equally distributed to the four brakes, the brake lining used in connection with Lockheed Hydraulic Four Wheel Brakes lasts about four times as long as when used with two wheel mechanical brakes.

In descending long grades, four wheel brakes remove fear of the car getting away—a fear that is always present when two wheel brakes are the braking equipment. Furthermore, four wheel brakes make it unnecessary to use the motor as a brake.

Because they never drag, they afford greater gasoline mileage.

Again, it has been objected that mechanical four wheel brakes increase the expense of maintenance. With hydraulic four wheel brakes, the

expense is less than with two wheel mechanical brakes.

Mechanical four wheel brakes, say some opponents, require greater power to operate the brakes and to steer the car.

Hydraulic four wheel brakes require less foot pressure than mechanical two wheel brakes.

A car equipped with hydraulic four wheel brakes steers just as easily under all conditions as a car equipped with two wheel mechanical brakes.

Other objections which have been made to mechanical four wheel brakes fail just as completely as those above mentioned, when confronted with the actual results which Lockheed Hydraulic Four Wheel Brakes have proved in the hands of hundreds of owners.

Leading cars, which will soon announce Lockheed Hydraulic Four Wheel Brakes as standard equipment, will quickly demonstrate to the whole American public that these hydraulic brakes are unapproached in every phase of performance.

Hydraulic Brake Company
5833 Russell Street Detroit, Michigan

LOCKHEED

Hydraulic Four Wheel Brakes

Corner the Relining Business

MULTIBESTOS offers you a new opportunity to do a bigger business and a better business than you are now doing. Without any special preparation whatsoever, and without need of spending extra money, you can establish your shop as the one place to go for brake repairs and relining.

You will be surprised to know how much business can be done by concentrating on this one thing. Think of all the safety talk that's in the air. Think of all the precautions now being taken by authorities to make driving safer. Then think how few garages and shops have yet begun to take advantage of all this free publicity.

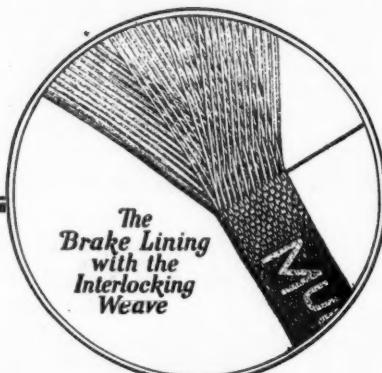
Multibestos not only supplies a lining that gives amazingly long service, and absolute satisfaction, but also provides a quick, efficient method of relining brakes that saves time for you and for the customer, by permitting you to reline the brakes without removing the brake band. And you can charge for the work on a very profitable flat-rate basis.

This is an age of specialists. The tire specialist makes money by handling tires and nothing else. The radiator specialist makes money by repairing radiators and nothing else. You can make money by making a specialty of relining brakes with Multibestos—the Brake Lining with the Interlocking Weave. Write us for full particulars as to how you can corner the relining business in your locality.

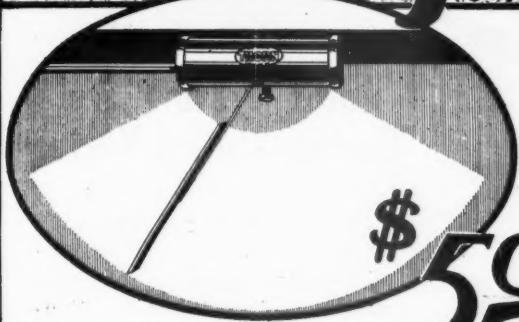
MULTIBESTOS COMPANY

Address Dept. MA-11
WALPOLE, MASS., U. S. A.

MULTIBESTOS



Built to Please— Improve Your Sales!



THORN
AUTOMATIC WINDSHIELD WIPER

*A large profit on each sale
and a satisfied customer.*

The Thorn Automatic Windshield Wiper is no experiment. We have letters from a large number of users telling of the excellent service it renders.

Dealers tell us that not only have they sold a large quantity of "Thorns" but that the purchasers are more than satisfied.

And after all isn't that the basis of a successful business—the sale of satisfactory merchandise to your customers, and each sale giving you a good margin of profit.

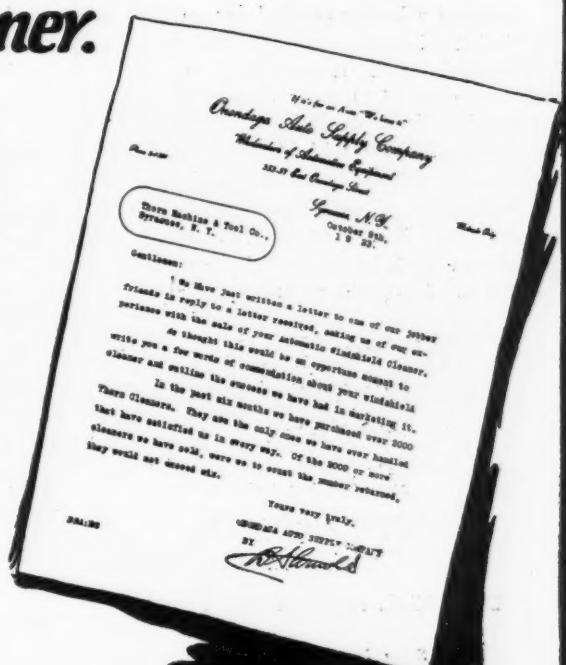
Mechanical Details

A small vacuum pump operates from the vacuum tank or intake pipe, powerful enough at all times to keep a generous arc of the windshield clear and unobstructed during the hardest snow, sleet or rain storm. The speed of the pump is easily adjusted at the driver's desire by a small regulating thumb screw. Easily and quickly installed on any type of car.

It is possible that your jobber does not stock "Thorns" at this time, but he can send us your order for direct shipment. Ask his salesman or write direct.

Thorn Machine Tool Corporation
106 Industrial Bldg., Syracuse, N. Y.

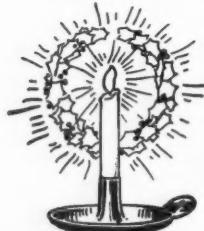
Sold over 2000
in past 6 months



Works so well and costs so little

Make This Interesting Test

Ask fifty or more experienced motorists and garage men what is the best Cutout and Motor Testing Valve to put on your car—ask them what is the best hand or Dash Control on the market. Be guided by what a very large majority of them will say, and we will be satisfied. Isn't that a fair test?



"Something for the Car for Christmas"

Dash Control

If you are installing a motor Testing and Carbon Outlet Valve, an exhaust heater, a radiator shutter, or want a better control for an air choke, investigate the Cooper Dash Control. It puts positive, instant control at your finger tips—a twist of the wrist locks it in any position. You will like its handsome appearance and recognize a high-grade piece of mechanism in the way it operates. No interference with levers, pedals or floor board. Exceptional value at \$2.50.

Ask your Dealer
Dealer write jobber
or us

Manufactured by

**COOPER MFG. CO.,
Inc.**

Dept. 15-C, Marshalltown, Iowa

Sales Representatives

The Fulton Co.

Milwaukee, Wisconsin

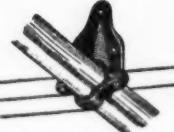
Ask fifty or more experienced motorists and garage men what is the best Cutout and Motor Testing Valve to put on your car—ask them what is the best hand or Dash Control on the market. Be guided by what a very large majority of them will say, and we will be satisfied. Isn't that a fair test?

Patented 2-27-23
No. 516028

\$2.50

Our jobbers will wrap
these products in Holly
paper for your Christmas
Trade, if you so request.

The Cooper



Steering Column Support for Fords

Holds steering column absolutely rigid, keeping wheel from vibrating. A strong casting; black finish; fits any Ford having instrument board—open or closed models. Packed in individual cartons. Price \$0.75.

Gives a clear, loud warning of motor troubles—helps you locate the trouble quickly. Gives a free outlet for carbon, keeps motor clean, saving fuel, oil and repairs. Construction is sturdy and compact. Extra heavy spring and rod axle prevent chattering. Easily installed without cutting exhaust pipe in two. A size for every car. Standard equipment on Paige Daytona and other fine cars.

Prices

	Valve Only
1½ in.	\$2.50
1⅔, 1⅔, 1⅔ in.	3.00
2, 2⅔ in.	3.50
2⅔, 2⅔, 2⅔, 2⅔ in.	4.00
2⅔, 2⅔, 3 in.	5.00

Complete for Fords with No. 3
pedal, \$3.00

When ordered complete with
Dash Control add \$2.50 to
above prices. Add 10 per cent
to these prices on Pacific Coast.



Patented

The **AERMORE**
Exhaust Horn

*"The Signal with
a Smile"*



Satisfaction
Guaranteed



PRICES

Complete with Valve and
Fulton Hand Control

No. 00 22 in. long, Motor
Busses and High-powered
cars \$14.00

No. 0 17 in. long, for large
autos, trucks, busses

\$12.00

No. 1 15 in. long, for me-
dium cars \$10.00

Ford Special \$7.00

Give name of car and out-
side diameter of exhaust
pipe.



An Aermore for the Car
for Christmas

THE FULTON COMPANY, Dept. 15-F Milwaukee, Wis.

The men who are driving your cars now should be your best prospects for future sales.



What brings him back?

REORDERS from men who have owned one or more of your cars are direct evidence of the amount of satisfaction you have sold them.

That satisfaction consists mainly of freedom from troubles that annoy owners of other cars.

Troubles that cause noise in the engine cannot escape notice. The experienced motorist looks over all the new models for developments that tend to lengthen the life of silence in the engine. What will he find in your new model?

Counterbalanced crankshafts, long bearings, and improved timing mechanisms all do their part in reducing the amount of noise that can develop as the engine wears. The timing mechanism especially must be accurate and silent. Noise in the timing gear case and inaccurate timing, two common faults of former equipment, no longer can be tolerated.

Celoron Silent Timing Gears are non-metallic. They eliminate rasps, grinds and howls. They retain accurate timing. Celoron Silent Timing Gears are tough, light, and strong. These gears, cut and moulded, are made of Celoron, a laminated phenolic condensation material, bonded with Condensite.

Celoron Silent Timing Gears can be used in any timing gear train. They are already standard equipment on many popular cars. They are used in place of metal gears and timing chains.

You can banish noise from the timing gear case and sell more satisfaction with your car. Celoron Silent Timing Gears help make engines run smoothly and silently. Drop us a line for complete information that has influenced many manufacturers to standardize on Celoron Silent Timing Gears for their new models.

Diamond State Fibre Company

BRIDGEPORT

(near Philadelphia)

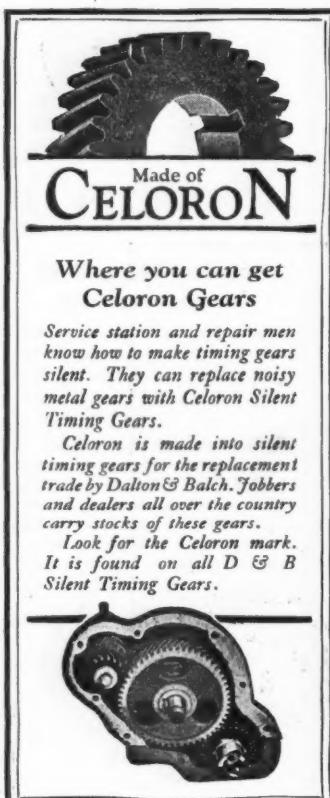
PENNSYLVANIA

Offices in Principal Cities

In Canada: Diamond State Fibre Co. of Canada, Limited, 245 Carlaw Ave., Toronto

Celoron SILENT TIMING GEARS

Make Celoron Silent Timing Gears standard equipment on all your future cars





Duplex

SECOND SPARE TIRE CARRIER & RIM TOOL

Two tools in one-tools that every car owner needs—for the price of one tool. That is the story of the Duplex Second Spare Tire Carrier and Rim Tool and the reason it is meeting with such pronounced success.

One size only to stock—no slow moving models. No installation—sale is completed at once and carrier is attached in a few seconds. Holds the two tires apart so they cannot rub and chafe. Tire covers can be used. Locks tires against theft. Three point suspension gives strong and rigid construction. Can be transferred from one car to another. No bolts, straps, nuts or additional parts.

We have a plan of real co-operation for jobbers and dealers which includes display cards, circulars and other sales helps. Write for literature and complete details.

SEE US
DURING A. E. A.
CONVENTION WEEK
at Room 212
AUDITORIUM HOTEL

We have added a New Number to our line, making it 100% complete, and invite your inspection.

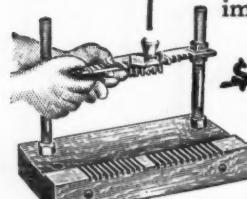
TRIPP-SECORD & CO.
606 Kerr Building
Detroit Mich.

The Duplex goes completely inside the rim resting on the three central points. When the handle is turned the rim is expanded and snaps into place.

AMBU

Announces REDUCED PRICES!

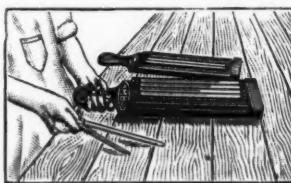
Volume production has decreased our manufacturing costs to such an extent that we are now able to make big reductions in our prices. There is no change whatever in the equipment itself. The quality for which Ambu Equipment is famous is not affected by the reduction in prices. This is a rare opportunity to get the finest equipment available at prices never before heard of. Your order will be shipped immediately.



Handy Plate
Burning Rack

~~\$5.95~~ now
\$2.85

Similar to Ambu Universal Burning Rack. Holds two groups of plates of standard $\frac{3}{8}$ " and $\frac{7}{64}$ " or thin plates. Hardwood base treated with acid-resisting paint. Ideal for small shops or valuable as extra equipment for larger shops. Shipping weight, 10 lbs. Stock No. 18.

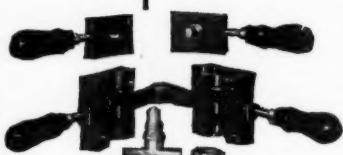


~~\$1.50~~ now \$1.00
Two for \$1.85

Ambu Lead Stick Molds

Put scrap lead into usable form. These molds form strips of lead ideal in size for burning in. Pay for themselves easily in less than one month.

~~\$15.65~~
now \$12.50



Threaded Post
Strap and Seal-
ing Nut Mold.



~~\$8.75~~
now \$4.85

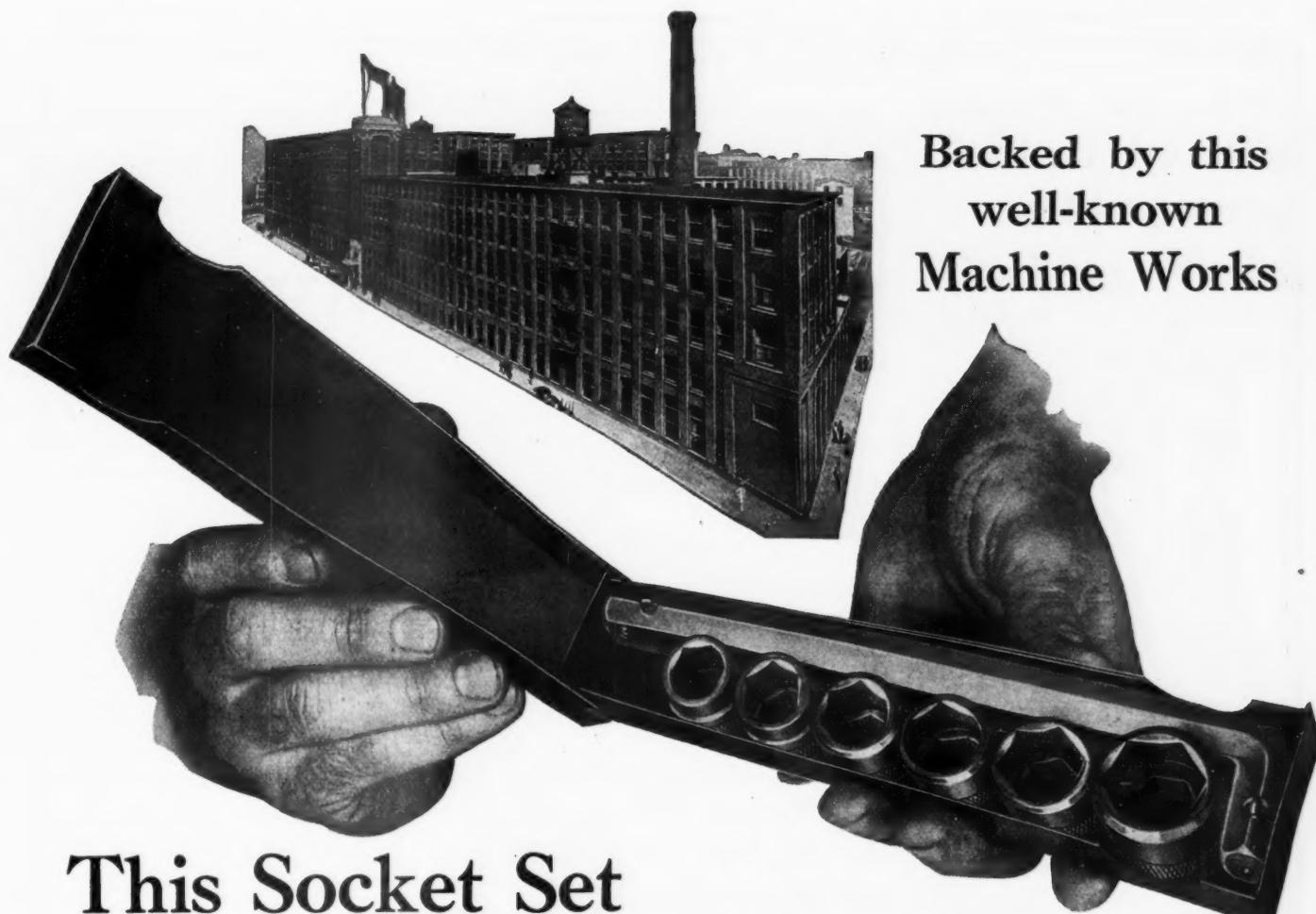
AMB Universal
Plate Burning Rack

The slotted base—exactly parallel with the slots in the comb—holds the plates in perfect alignment. Hardwood treated acid-resisting base prevents particles of rust and iron getting on the plates. No "come-backs." Six different styles of plate groups may be assembled. Three groups of one size plates may be "burned in" at a time. Complete with fittings. Shipping weight, 15 lbs. Stock No. 17.

Buy Now! Write for address of your nearest Jobber.

AMERICAN BUREAU of ENGINEERING, 2638 Prairie Ave., Chicago

BATTERY SERVICE EQUIPMENT



This Socket Set in a Pressed Steel Box



The most needed sockets for any car—including the FORD—and a big, comfortable hex. handle in a pressed steel box retailing for \$1.25 is proving good news to jobbers and dealers everywhere.

Back of this set of wrenches stands the New Britain Machine Co., builders of "New Britain Automatics," in use by automotive plants everywhere. There is **QUALITY** in every line. The sockets are heat-treated to give a file-hard wearing-surface and a tough core. Both sockets and handles are mottle-finish.

The handle is not the usual 7-16 in. hex. but is **HALF-INCH**. This little increase is the difference between a comfortable handle and an uncomfortable one. The box is of heavy gauge pressed steel, baked-on black enamel with the cover hinged at one end. The well-known N. B. trade-mark is in gold on the cover. The price of Set No. 3 as shown—\$1.25 retail.

The New Britain Machine Co., New Britain, Conn.
(Screw Products Dept.)

NONE BETTER
No. 3 Socket Set

Backed by this
well-known
Machine Works



JOBBERS: They positively sell on sight—to jobbers, dealers and car owners alike. This **DISPLAY CARTON** keeps them in sight on the dealer's counter and registers sales automatically. It is proving itself the very best kind of a retail salesman. Thousands of sets have already been sold.

LET US SEND YOU A SAMPLE SET and our proposition.

DEALERS: Write us for the name of a jobber in your territory.

Lighting the Way

LIKE a beacon in the Dark, the A. B. C. Torch of Verified Circulation shows the safe road of Sound Advertising Practice.

Today, all the investigating and reporting facilities of the Bureau are at the service of the advertiser, furnishing reports on practically all the worth-while publications of Canada and the United States.

In its eight years of diligent service to the Advertising and Publishing World, the A. B. C. has brought Circulation Buying from the darkness of Uncertainty to the light of Verified Circulation.

The Bureau has established the principle of honesty in Circulation as the standard of practice in buying and selling advertising space.

Most advertisers today protect their appropriations by demanding A. B. C. reports and placing their campaign in the light of the valuable data they contain.

*MOTOR AGE is a member of the
A.B.C. and would be pleased to submit
a copy of the latest circulation report*

DEMAND A.B.C. REPORTS BEFORE BUYING SPACE

Ford Service Dealers!!

Sell Service at a Profit

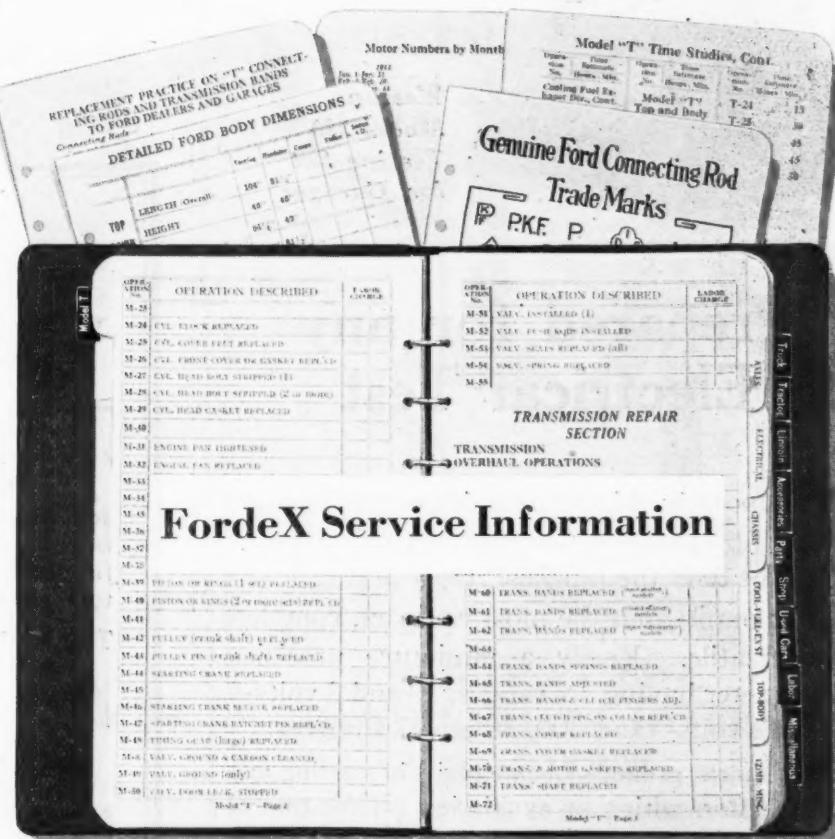
"Fordex" SERVICE INFORMATION is the most complete book of AUTHORIZED Ford Service Data, ever compiled and published.

There is data in SERVICE INFORMATION that has never before been assembled for reference. It is positively an innovation that Ford Service Men everywhere have received with an enthusiasm little short of remarkable.

The information and data in SERVICE INFORMATION is logically arranged and conveniently indexed, so that information on any desired subject can instantly be found.

It is bound in a standard loose-leaf, leather finished binder with six 7-16 inch rings. The index tabs are of genuine leather, lettered in gold.

SERVICE INFORMATION is "coat-pocket" size and can be carried all the time without inconvenience.



Creators of **Fordex** Products
SALES EQUIPMENT COMPANY

Price
\$3.50
POSTAGE
PAID

5979 Woodward Avenue
Enclosed find \$
for the address below
Name _____
Address _____
City _____
State _____

WRITE FOR OUR BOOK OF SALES HELPS
SALES EQUIPMENT COMPANY
Detroit, Mich.

There is a compilation of Standard Ford labor operations that is decidedly new in arrangement! The sample pages shown above prove its common sense application to Ford Service problems.

Time studies on every known repair operation, hundreds of which have never before been published. This data was secured by actual check on a number of jobs and then declaring an average.

The information in "Fordex" SERVICE INFORMATION is indexed under the following ten divisions: MODEL "T," TRUCK, TRACTOR, LINCOLN, ACCESSORIES, PARTS, SHOP, USED CAR, LABOR, and MISCELLANEOUS.

Each section is exhaustively covered. The following is a partial listing of the contents:

Up-to-date motor numbers of the Ford, Lincoln and Fordson along with those of ten other makes of cars in the Ford and Lincoln fields. Complete engineering specifications and detailed description of mechanical features. A suggested SERVICE POLICY.

It contains many illustrations, charts, forms, etc., for expediting the work in the Service Department. In fact it is a complete book of AUTHORIZED service data in compact form that was specially prepared for the convenience of men engaged in the sales and service of Ford, Lincoln and Fordson products.



Weston
Model 280
Testing Set
for Garages

Prepared for any Electrical Test

TO possess this set permits you to say—"I am prepared to make any electrical Test."

Not only the quickest, most accurate and efficient outfit—but the most compact, complete and versatile. Really a miniature precision voltammeter having six ranges, 30 and 3 volts—100 milli-volts—and 300, 30 and 3 amperes.

Locates shorts, grounds, open circuits in starting motor, generator, wiring or auxiliaries. Gives rate of battery charge. Tests condition of batteries. Locates defective plates. Measures current required for starting motor, lights, etc. Cadmium test cables also supplied, if desired.

Send for Booklet H

It illustrates, describes and gives prices of all Weston instruments and accessories for automotive service. If only to be properly informed, you need this booklet.

Weston Electrical Instrument Co.
10 Weston Ave., Newark, N. J.

WESTON

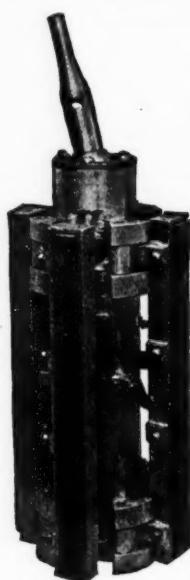
Electrical Indicating Instrument Authorities Since 1888
STANDARD-The World Over



You Should Worry? —About Flat Rates

THE problem of doing a first class job without being eaten up by time holds no discomfort for the owner of a Hall Cylinder Hone. He is doing more business at a big profit, getting his floor cleared quicker and pleasing his customer by not keeping the car tied up.

The Hall Cylinder Hone is designed to do perfect work. The expansion of the stones is co-ordinated by one central spring that prevents following out an oval. The stone carriers are hinged to maintain a rigid parallel. They cannot tip or follow a taper.



Wear on the cylinder walls hardens the metal to a usual depth of .003". Reborning or grinding removes most of this valuable metal exposing a fresh texture that wears rapidly. Honing laps off enough accurately to restore a true hard surface with a high polish.

Invest in Hall's Cylinder Hone. Made in two sizes at \$50 each.



OK'd
by BUICK

After 8 months of actual service tests in 8 Buick branches the Buick engineers have recommended the Hall Cylinder Hone in all of their branches.

Carried by all leading jobbers
The Hall Cylinder Hone Co.
435 Dorr St., Toledo, Ohio



—that
Small Unit with the
BIG Responsibility

TUCKED away under the bonnet, the generator cutout is unseen and unknown as far as the average motorist is concerned. When it goes wrong and you replace it, your reputation demands a renewal unit of unquestioned dependability. Renew with the genuine



**Generator
Cutout**

the cutout of absolute reliability. Hundreds of thousands of Basco Generator Cutouts are giving consistent, unfailing service on many varied makes of cars.

Embodying the experience, manufacturing knowledge and skilled workmanship that in 12 years have made Briggs & Stratton automotive electrical components standard equipment on a large percentage of the leading makes of cars and trucks, the Basco Generator Cutout is the ideal renewal unit. Write for name of nearest Basco distributor.

Heavy series winding; high resistance shunt coil; solid, riveted assembly; pure coin silver contacts; special bracket for Ford mounting; guaranteed to give complete satisfaction. List prices: No. 1655, 6-volt, 15-amp., \$2.00; No. 1441, 12-volt, 15-amp., \$2.55.

**Briggs &
Stratton Co.**
Milwaukee, Wisconsin

HENRY

One-Lift Auto Jack

—Just Step

Once
on the
Lever

Ready
for
Action



Disassembled
for the
Tool Box

**SEE IT AT THE
AUDITORIUM HOTEL
ROOM 208**

During the A. E. A. Show, November 12th to 17th. Drop in while the Show is on and examine this moneymaker and other items that will interest you. Price right, terms right, every feature a sure-fire selling argument for the light car owner.

Unique! Different! No Competition! Nothing else like it on the market.

Thousands of HENRY Jacks sold in 1923
Tens of Thousands will be sold in 1924

SPECIAL ANNOUNCEMENT!

There will also be exhibited something new, unusual and mighty interesting from the profit standpoint,—the BURNS Instant Drop Jack for medium and heavy cars, with such special features as the long extension handle, three height saddles, instant drop or easy return of load.

SEE THESE PROFITABLE ITEMS

Our Distributors:

D. H. MARSH Waynesboro, Virginia
A. L. RICHTMYRE, INC. 35 S. Dearborn St., Chicago
E. W. HOFFMAN 9052 181st St., Jamaica, N. Y.
HARRY STONE & CO. 200 Summer St., Boston, Mass.
FRED V. MCGRAW CO. 3124 Locust Blvd., St. Louis
AUTO EQUIPMENT & SPECIALTY CO. Raleigh, N. C.

**Wolverine
Specialty
Company, Inc.
Battle Creek, Mich.**

*"Something for the Car
for Christmas"*

Sell Winter Comfort to Ford Owners

HELZEN PEDAL SLOT CLOSERS

Separate Closers allow for perfect alignment with each pedal.

Bolted to lower board only

Special Rubber hugs the pedal and closes slot completely.

Rubber runs full length of Closer

HELZEN CORP.
MILWAUKEE

Ask your Dealer—Dealer
Write Jobber or us

THE FULTON COMPANY

Dept. 15-H
Milwaukee, Wis.

These easily-attached, neat-looking, Helzen Pedal Slot Closers keep out the cold drafts of air that come up through the pedal slots of a Ford in cold weather.

An Ideal Christmas Gift

Wrapped in holly paper if requested, making an attractive Christmas package.

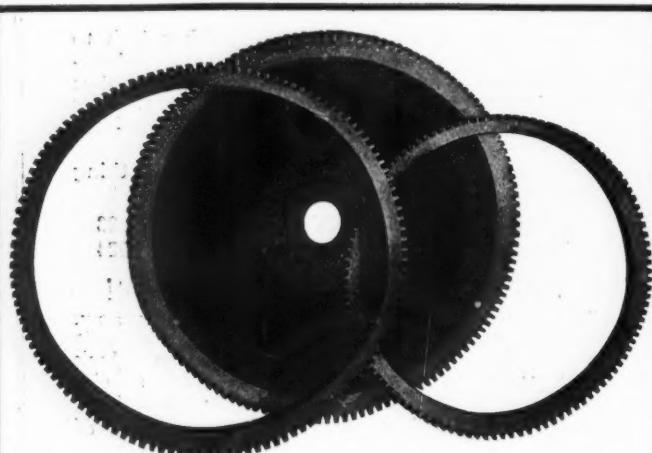
The rubbers fit snugly about the pedals, run full length of the slots and closes them completely, yet there is no interference with the operation of the pedals or the removal of floor board.

Price Per Set, \$2.25

For all Fords. Type A is for Coupe, Roadster, Touring Car or Truck. Type B is for Sedan only.

DEALERS Stock this live item now, for which the demand is already created. If your jobber cannot supply you, write us direct for immediate delivery, giving name of jobber.

Exclusive Sales Representatives



New Low Prices On Fly Wheel Rings

Increased quantity production has enabled us to get out a new and lower price list on Meachem Steel Gear Rings for Fly Wheels. Also our trade discounts have been increased to more than offset the lower list prices. Write us for the new list and discounts.

The Meachem Gear Corp'n.
Ring Dept. Syracuse, N. Y.

Selling trucks and buses is easier when you know the owner's viewpoint

Read Motor Transport.

It tells you the problems of the Fleet Owner. It tells you how Fleet Owners are making and can make a success of truck or bus operation.

Just as *Motor Age* tells you how to handle your business, so *Motor Transport* tells how to efficiently operate fleets of motor trucks and buses. Reading *Motor Transport* will make you a better dealer.

Recommend fleet owners to whom you have sold trucks or buses to subscribe for *Motor Transport*. This magazine will make them more efficient operators.

You will both benefit!

Motor Transport is published semi-monthly, on the 1st and 15th. The subscription price is \$2.00 per year (\$2.50 West of the Mississippi).

Write for a sample copy.

**Motor
Transport**
FORMERLY COMMERCIAL VEHICLE

(Published by the Class Journal Co.)

239 West 39th St. New York, N. Y.



Buy Ball Bearings for Quality First

BALL bearings are the one part of a motor car or truck that must not be of questionable quality.

Satisfied customers are only made by using satisfactory parts and R. I. V. BALL BEARINGS are recognized the world over as the ball bearing of unchallenged quality.

They will help you build the kind of a reputation—that will bring you new business.

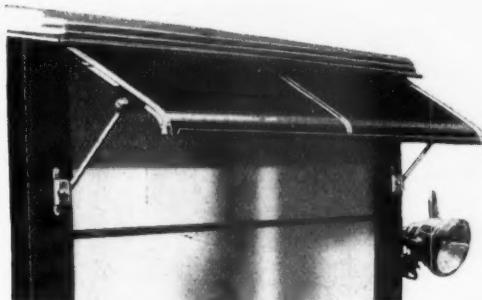
Italian craftsmen have used their skill in producing them, and American genius has placed an uninterrupted supply within easy reach of any service man wherever located.

Look up the R. I. V. service station near you next time. They have exactly what you need and are always anxious to give you quick, efficient attention.

1755 Broadway



New York City



**Fast Sellers—no come backs or servicing to kill profits on
"Buffalo" Visors**

In keeping with the appointments of finest cars. Finished in black eggshell enamel above and restful green below. Touched off with burnished aluminum brackets and trimmings it is a fine buy at \$7.50. We also make a one-piece all-black steel visor for \$3.00.

for they are solid steel—breakless, warpless, rattle proof and *stay so*—enameled to last as long as the car finish and as easily renewed. Eyesight saving—prevention of accidents due to glare or blurred windshield—and increased ability to really see and enjoy.

Surely these are objects worthy of any dealer's best efforts and we will help. Write for details while attractive territory remains. See our exhibit 168-168½ at A. E. A. Show, Chicago, Nov. 12-17.

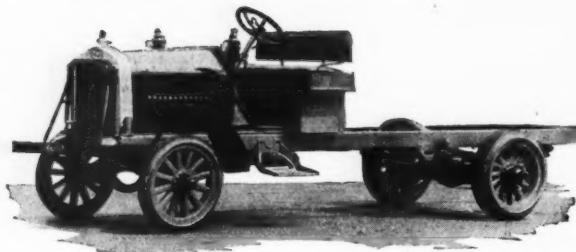
Buffalo Forge Company

184 Mortimer St.

Buffalo, N. Y.

MASTER TRUCKS

Balanced Oversize



SPEED MASTER— $\frac{3}{4}$ — $1\frac{1}{4}$ ton

Highest Achievement for fast freight transportation

HEAVY DUTY MODELS— $1\frac{1}{2}$ to 6 ton

A revelation to Motor Truck Buyers

Highest grade recognized standard units used throughout. Built by a responsible Company of unquestioned financial stability.

Valuable Territory Open to Responsible Dealers

MASTER MOTORS CORPORATION

2381-2399 Archer Ave.

Chicago, U. S. A.



Breaks Off Clean

The scores between holes, in Universal Hose Clamps, make it easy to break off overlap. No ragged end—but a clean, smooth edge.

The patented bead, another Universal feature—forms a pressure ridge that creates an everlastingly leak-proof connection.

Two sizes of Universal Hose Clamps cover all jobs. Junior from $\frac{1}{4}$ inch to $1\frac{1}{2}$ inches, Senior from 1 inch to 3 inches. 50 to a carton—and our trade mark and name is on every carton and every clamp.

Order from your jobber. Specify the genuine Universal Hose Clamp. Known throughout the trade.

Universal Hose Clamp fits all. Quick—effective and leak-proof. Order today.

Made only by

UNIVERSAL INDUSTRIAL CORPORATION
Hackensack, N. J.

UNIVERSAL Hose Clamp
Adjustable to fit any hose of any size



Trade Mark Registered

“WHITNEY”

HIGH MILEAGE CHAINS

For Front End Drive Replacements

THOUSANDS OF SATISFIED USERS
THE BEST RECOMMENDATION

We Can Furnish Chains for the Following Cars:

Anderson	Franklin	Moon
Cadillac	Hall-Scott	National
Case	Motor	Oakland
Chalmers	Haynes	Packard
Chandler	Hudson	Pan
Cleveland	Hupmobile	Rickenbacker
Columbin	Jeffery	Revere
Continental	Jordan	Saxon
Moors	King	Star
Davis	Lafayette	Stearns-Knight
Drexel	Lincoln	Studebaker
Essex	Lozier	Tempstar
Fageol	Mercer	Winton
Fox		

When you equip your motor with “WHITNEY” you can forget your chain troubles.

THE WHITNEY MFG. CO.
HARTFORD, CONN.

New York
L. C. Biglow & Co.,
Inc.
243 West 55th Street

Boston
George C. Stell,
200 Devonshire St.

Philadelphia
R. J. Howison
624 Race St.

San Francisco, A. H. Coates Co., 770 Mission St.



*The Fluid
Absorbs
The Shock*



OUR HYDRAULIC SPRING CONTROL, with its dual valve system, not only stays sold in the hand of the customer, but the customer BECOMES A BOOSTER.

Hence our franchise not only brings profit, but HELPS YOUR OTHER BUSINESS by making pleased and satisfied customers.

Desirable territory still open. Write.

AUTO SPRING
CONTROL CO.

Jamestown
New York

2 WAY
HYDRAULIC
SHOCK
ABSORBERS

SAVE TIME WITH *The Cincinnati "Junior"*

$\frac{1}{4}$ " PORTABLE ELECTRIC HAND DRILL
BALL BEARING -- WEIGHT 5 LBS.



PRICE **\$28**

Pistol Grip with Automatic Switch. Mandrel with emery wheel or buff for light grinding and polishing. Bench base with clamp for holding drill for above work.

$\frac{1}{2}$ " "Special" Drill

BALL BEARING -- UNIVERSAL MOTOR

PRICE **\$65**



Powerful, durable, compact. Combination Bench Drilling Stand for use with this drill.

A complete line of Portable Electric Drills, Grinders and Buffers. Send for Catalog.

THE CINCINNATI ELECTRICAL TOOL CO.

1515 Freeman Ave., Cincinnati, Ohio
New York Seattle Philadelphia
50 Church St. 1115 Federal Ave. 1228 Real Estate Trust Bldg.
San Francisco Los Angeles
918 Hearst Bldg. 510 Equitable Bldg.



Bosch

Robert Bosch Spark Plugs

like the genuine, original Bosch Magneto, are the finest products of their kind in the world.

Let us tell you how we help you build profitable sales with these plugs.

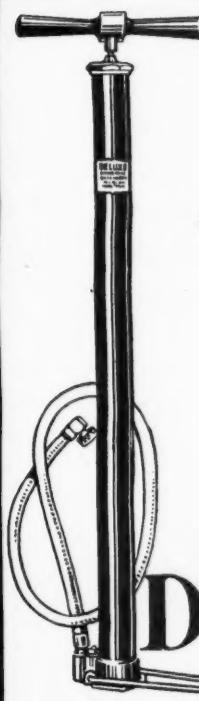
Attractive territory and efficient sales cooperation available.

Robert Bosch Magneto Co., Inc.

Otto Heins, President
123 West 64th Street, New York
Chicago Branch: 1302 So. Wabash Ave.
The Genuine, Original Bosch means
Robert Bosch only



Easily taken
Apart for
Cleaning.



Sold today;
still on the job
in 1928

Only \$3.50 Retail

ORDER DIRECT
SPECIFYING
JOBBER

The
DeLuxe
TIRE PUMP

Also
ARVIN HEATERS
DE LUXE,
DE LUXE VENTILATORS

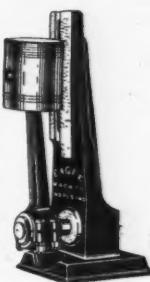
INDIANAPOLIS PUMP & TUBE CO.
INDIANAPOLIS



FOR SMALL CARS

Fords, Chevrolets, and
Overlands, \$15.

The Eagle Junior Aligning Fixture designed especially for use on small cars, is built of the same high-grade materials and with the same accurate workmanship that has made the Universal Eagle Aligning Device an indispensable bench fixture in thousands of garages and repair shops.



The Eagle Junior Aligning Fixture is a super-efficient device for proving Ford, Chevrolet and Overland wrist pins, bushings, connecting rods and pistons to precision. It speeds up the job and earns satisfied customers.

Order from your jobber or
write us for information

EAGLE MACHINE CO.

24 N. Noble St.

Indianapolis

The MARVEL Radiator Cap Prize Contest

—was announced in the November 1st issue of Motor World and Motor Age. Get your answers in early. Next week we will announce the names of the judges on the contest committee.

Motor Equipment Manufacturers, Inc.,
33 West 60th St., New York, N. Y.

Make the Big Money in Winter Overhaul Jobs

Cylinder renewing offers the big money in winter overhaul jobs. Are you equipped to keep this profit yourself—or must you let it get away to others?

Stormizing Machines
Will handle all your cylinder renewing. Will add a big profit to your winter shop jobs. Look into this better method of cylinder refinishing. Send today for our book: *Modern Cylinder Methods*.

STORM
MANUFACTURING CO.
406 A Sixth Ave., So.,
Minneapolis, Minn.



KESS High Speed Valve Grinder

Positively Grinds valves in $\frac{1}{4}$ usual time and guarantees a better job. Can be operated at 4,000 r.p.m. Fits any electric drill or hand drill. Absolutely NO VIBRATION. Weighs 8 ounces. Easily reaches rear cylinder of Fords. Price \$5. Get details from us or from any electric drill manufacturer.

Kess Manufacturing Co.
809 Harrison Bldg.
Philadelphia, Pa.



BLACK & DECKER QUARTER INCH DRILL



\$28.00

"With the Pistol Grip and Trigger Switch"

THE BLACK & DECKER MFG. CO.
Towson, Md.

Protection, Is the Chief Function



The New Duo-Convex, double convex spring bars with back bar reinforcement. Black or nickel. Prices \$15 to \$22, according to size and finish. Without back bar, for Fords and other light cars, \$12 to \$15.



The New Sport Duplex Model. Most beautiful bumper on the market. Black, japan or nickel. Medium cars, black, \$14.50; nickel, \$16.50. Large cars, full nickel only, \$24.

of New Era Bumpers. The strong, resilient broad Spring Bumpers protect lives and in protecting lives save property from destruction.

It is time to begin thinking about Something For The Car For Christmas.

Write for Catalog.

NEW ERA SPRING AND SPECIALTY CO.

SMALLEY DANIELS, President

70 Cottage Grove St. Grand Rapids, Mich.
Export Department, 130 W. 42nd St., New York City

THERE ARE PARTICULAR WALDEN-WORCESTER SOCKET WRENCHES FOR PARTICULAR PARTS OF EACH PARTICULAR CAR



For over sixty makes of cars and trucks in general use today, Walden-Worcester has Service Selections of Socket Wrenches—each selection especially adapted for particular parts of the particular car for which it is designed.

Your Jobber can supply you with any or all Selections from his stock. Write him.

WALDEN-WORCESTER

Incorporated

General Offices and Factory

Worcester, Mass.

With Only City Gas as Fuel No Forced Air Blast The No. 101

JOHNSON Bench Furnace Has Proven the Best For

Any Bench Work Requiring Heat

JOHNSON GAS APPLIANCE CO.
Cedar Rapids, Iowa

WHEN ALL advertisers demand their money's worth, all publications will provide circulation reports verified by the Audit Bureau of Circulations.

It is one of the mysteries of the advertising world that while all manufacturers demand verification of weight and quality in the material purchased, some of them still buy advertising space without knowing what they are paying for.

Such advertisers, however, are now exceptional. Most of them demand verified A. B. C. circulation statements before placing contracts.

In the case of MOTOR AGE, the demand is immediately met.

It is a member of the Audit Bureau of Circulations.

QUIT GRINDING VALVES!

You are wasting time and needlessly inconveniencing yourself if you are grinding the valves in your motor, or having them ground. The Boyle Valve Company makes a flat seat valve that grinds itself every time it closes. A radial action keeps the seat as clean as new. Boyle valves run from 50,000 to 100,000 miles without any attention.

Chicago Sales Agents

Ferreira Sales Company

1436 Wabash Ave.

For full particulars write to

BOYLE VALVE COMPANY
2101 LARRABEE ST. CHICAGO

Stop Scraping Motor Bearings

by hand—use the

Elk Machine

100 per cent bearing in 15 minutes. Wrist Pin Bushings Reamed in perfect alignment. Forces out Wrist Pins. Tests squareness of Wrist Pins and Pistons.

The most important Labor Saving Tool in shop equipment.

Send for Circular-Bulletin

Elk Machine Tool Corporation

243 West 17th Street New York



STAR BALL RETAINERS for Thrust, Magneto and Cup and Cone Types of Bearings—

The Bearings Company of America
Lancaster, Penna.

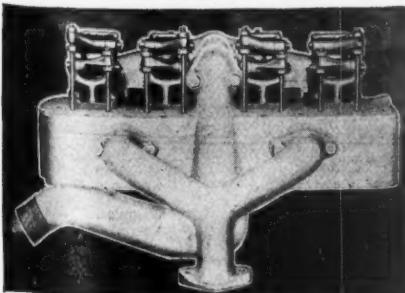
Western Sales Office,
1012 Ford Bldg., Detroit, Mich.



ROOF 16 OVERHEAD VALVE EQUIPMENT
For Ford and Dodge Motors
ROOF 8 VALVE HEAD FOR FORD MOTOR

Stupendous Power—
Lightning Speed

Ford racing cars with Roof Equipment are rivals on mile and one half mile tracks of the highest priced racing cars. Doubles the pulling power of the Ford or Dodge pleasure car or truck. Hill climbing and general road work beyond wildest dreams of the owner. Complete—ready for installation—no machine work necessary. We are headquarters for all speed equipment. No matter what you want, write us. Racing quality—lowest prices. A postal card brings you complete list of our specialties.



Jobbers—Dealers—Consumers—Write Us
THE LAUREL MOTORS CORPORATION, ANDERSON, INDIANA

WISE REPAIRMEN RECOMMEND



*They are Guaranteed to
give Entire Satisfaction*

Manufactured by

ELGIN MACHINE WORKS
ELGIN :: :: :: ILLINOIS



More metal polish sales than ever before

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Adjustable to all positions.
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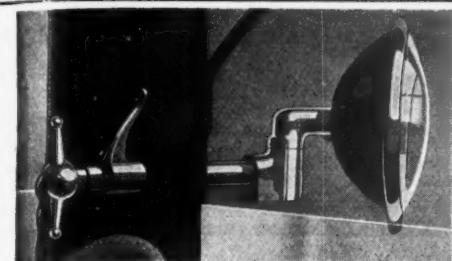
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FRONTENAC CYLINDER HEADS

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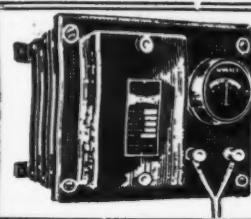
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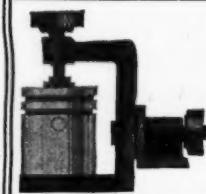
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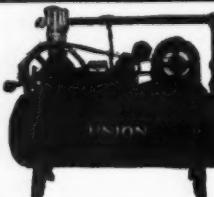


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Water Pump for Fords
ONLY \$5.75
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Eliminates that noisy rattling, bumping and back-lash in the rear axle. Saves universal joint, because it keeps the grease inside, where it belongs.

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Largest Auto Wreckers in the Country
Grant and Water Sts. Pittsburgh, Pa.
Mail Orders Given Prompt Attention

AUTO PARTS

Nearly 3,000,000 Auto Parts.
Why buy new parts, when we can
SAVE YOU 50% to 75% off list?
Parts for all models, Maxwell, Overland, Studebaker, from 1910 to 1920, and others.

EUREKA AUTO PARTS & TIRE COMPANY
334 N. Capitol Ave. and 503 N. Illinois St.
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DOWMETAL PISTONS
Lighter, stronger, and longer wearing than aluminum or iron. Can be fitted with bronze bushings in the wrist pin holes same as in iron pistons. Dowmetal has no permanent growth. The expansion is little more than iron.

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PROMPTNESS ASSURED BEST RESULTS
Send drawing or model for examination
and report as to patentability

WATSON R. COLEMAN, Patent Lawyer
624 F Street N. W., Washington, D. C.

Attorney-at-Law and Solicitor of Patents
C. L. PARKER

Formerly Member Examining Corps., United States Patent Office

American and foreign Patents secured. Searches made to determine patentability and validity. Patent suits conducted. Pamphlet of instruction sent upon request.

McGill Building, WASHINGTON, D. C.

We've Got Everything

In New and Used Auto Parts, Accessories and Supplies, for all makes and models of cars.

Engines; Transmissions; Clutches; Axles; Wheels; Rims; Tires; Radiators; Gears; Axle Shafts; Bearings; Magnets; Starters; Generators; Coils; Batteries; etc., etc.

Ours is the largest stock of its kind in the world.

Warshawsky & Co.

World's Largest Replacement Parts House
1914 So. State St., Chicago, Ill.
No Branches Ph. Calumet 7315 No Branches

AUTO INDUSTRY MAILING LISTS

Send to headquarters for dependable lists of Automobile Owners, Dealers, Accessories, Garages, Tire and Battery Stations, Truck Fleet Owners, Bus Lines, Taxicab Companies. Write for catalog and prices.

MOTOR LIST COMPANY
403 Grand Ave. 433 Howard St.
Des Moines, Iowa Detroit, Mich.

SALESMEN, High grade salesmen with mechanical training to sell Davenport Heavy-duty Oil Engines to dealers and Industrial Plants. Opportunity to earn big commissions. Full time and side line men wanted. Write Dept. 304, Davenport Mfg. Co., Inc., Davenport, Iowa.

REACHING YOUR MARKET

If you have stocks of parts, accessories, or supplies for immediate disposal, the logical place to get in touch with your buyers is this Classified Advertising Section.

Classified Advertising Department

MOTOR AGE

Chicago, Illinois



Making An Easy Sale Easier

Snap-on Interchangeable Socket Wrenches are easy to sell by themselves, but with the handy kit bag shown above, into which a kit of Snap-ons selected for any specified make of car can be dropped, an easy task becomes much easier. Car owners like Snap-on kits, because they are specially selected for their individual cars, and are easily stowed under a seat. Write for dealer proposition today.

MOTOR TOOL SPECIALTY CO.,
14 E. Jackson Blvd., Chicago, Ill.

SNAP-ON WRENCH CO.,
Manufacturers,
Milwaukee, Wisconsin

Snap-on INTERCHANGEABLE Socket Wrenches

*"Practically
Wear-Proof"*



Self-Aligning Center Bearing! CIRCLE "S" SWIVEL JOINT FOR SPEEDOMETERS

At no time is the car owner so receptive to sales talk on wearing qualities, as when his old swivel joint has worn out. That's the time to tell him how the self-aligning center bearing makes the Circle "S" Swivel Joint practically wearproof and its 7 other features insure perfect service.

F. W. STEWART MFG. CORP.
356 W. Huron St.,
Chicago, Ill.

Manufacturers of the well-known Circle "S" Automatic Windshield Cleaner

Write Us Today for Details & Discounts

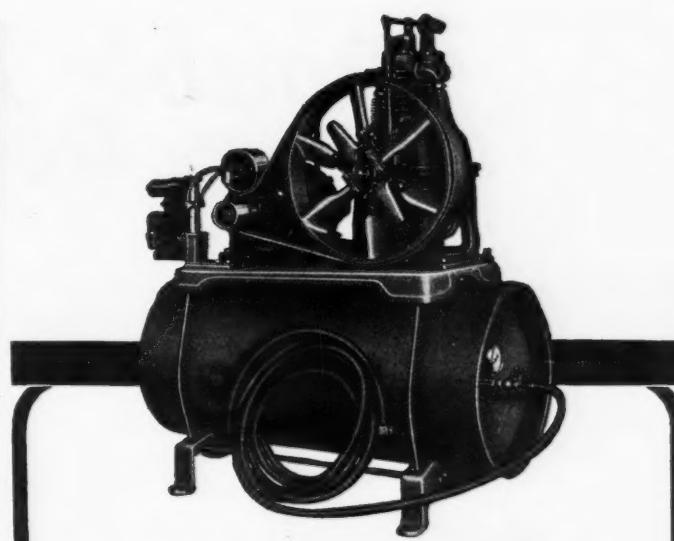
Index to the

The Advertisers' Index is published as a convenience and not as a part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

A. C. Spark Plug Co.	58
Adjustable Bearing Co.	105
Ahlberg Bearing Co.	109
Albertson & Co.	106
Allen-Bradley Co.	107
Allen Mfg. Co.	102
Almond, T. R., Mfg. Co.	80-81
Alvord Reamer & Tool Co.	102
American Asbestos Co.	104
American Bureau of Engineering	90
American Flatlite Co., The	102
American Hammered Piston Ring Co.	65-68
Ames, B. C., Co.	102
Anchor Electric Co.	103
Apex Elec. Mfg. Co.	69
Auburn Automobile Co.	70 & 71
Auto Spring Control Co.	98
Automatic Elec. Devices Co.	105
Automotive Gear Works, Inc.	112
Continental Auto Parts Co.	80-81
Cooper Mfg. Co.	86
Corrugated Bar Co., Inc.	106
Curtis Pneumatic Mach. Co.	111
Diamond State Fibre Co.	88
Dickerson, C. A., Compressor Corp.	106
Duesenberg Auto & Motors Co.	104
Durant Motors, Inc.	64
Eagle Machine Co.	99
Eastern Mach. Screw Corp.	107
Eaton Axe & Spring Co.	60
Eclipse Machine Co.	57
Edison Mazda Lamp Wks.	Bk. Cov.
Elgin Machine Works.	101
Elk Machine Tool Corp.	101
Empire Tire & Rubber Co.	104
Fedders Mfg. Co.	106
Fitzgerald Mfg. Co.	104
Folberth Auto Spec. Co.	106
Forest Electric Co.	109
Foster-Johnson Reamer Co.	106
Franklin Air Compressor Wks.	108
Fredericks, H. M., Co.	106
Fulton Co., The	87, 96
Gallow All-Steel Body Co.	105
Gardner Motor Co., Inc., The	108
Gates Rubber Co.	107
Gemco Mfg. Co.	102
General Asbestos & Rubber Co.	107
General Automotive Corp.	105
Gill Mfg. Co.	106
Goodrich, B. F., Rubber Co.	3
Great States Corp.	107
Green Engineering Co., The	102
Hall Cylinder Hone Co., The	94
Harvey Rim & Wheel Co.	105
Hays, J. M., Wood Prod. Co.	108
Heald Machine Co.	102
Champion Spark Plug Co. Ft. Cov.	109
Chevrolet Bros. Mfg. Co.	105
Chicago Soldier Co.	108
Cincinnati Elec. Tool Co.	99
Cincinnati Victor Co., The	106
Clearing House	109
Cole Motor Car Co.	7
Colonial Gear & Mfg. Co.	102
Indiana Rubber & Insulated Wire Co.	103
Indianapolis Pump & Tube Co.	99

Advertisements

Inshield Prod. Co.	102
International Harvester Co.	108
Interstate Bearing Co.	106
Jacobs Mfg. Co.	80-81, 104
Johnson Automobile Lock Co.	108
Johnson Gas Appliance Co.	100
Jorgensen Specialty Co.	107
Kauffman Metal Prod. Co.	107
Kellogg Mfg. Co.	80-81
Kelso Mfg. Co.	108
Kess Mfg. Co.	100
King Sewing Machine Co.	106
Kissel Motor Car Co.	105
Kokomo Rubber Co.	108
Krein Chain Co., The	107
Landis Tool Co.	108
Laurel Motors Corp.	101
Lincoln Products Co.	108
Linley Bros. Co.	109
Louisville Electric Mfg. Co.	103
Lupton, Hill & Lupton Co.	106
McQuay-Norris Mfg. Co.	77
Manley Mfg. Co.	2nd Cov., 80-81
Master Motors Corp.	98
Menchem Gear Corp.	96
Milwaukee Die Casting Co.	104
Milwaukee Motor Prod. Co.	4
Monogram Lens Corp.	105
Mossberg, Frank, Co.	80-81
Motor Equipment Mfrs., Inc.	100
Motor Wheel Corp.	105
Multibestos Co.	84
Nash Motors Co.	6
New Britain Mach. Co., The	91
New Departure Mfg. Co.	103
New Era Spring & Spec. Co.	100
No-Leak-O Piston Ring Co.	102
Norlipp Co.	82
Norwalk Auto Parts Co.	104
Oxweld Acetylene Co.	80-81
Petersen, A. H., Mfg. Co.	74
Pfaff Manufacturing Co.	103
Pines Mfg. Co.	108
Porter Mirror & Glass Co.	108
Precision Equipment Co.	8
R. & V. Motor Co.	105
R. I. V. Co.	97
Red Giant Tool Corp.	104
Reiter-King-Dugan Co.	61
Republic Motor Truck Co.	78 & 79
Roland & Koch	105
Rosendale-Reddaway Belting & Hose Co., The	104

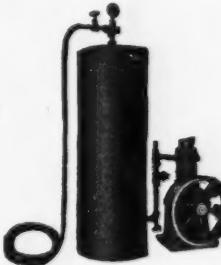


Real Air Service in This Curtis

THE above illustration is the Curtis Style TV Two-stage Outfit—one of the family of popular Curtis Outfits—the last thing in air compressor design—free of complicated parts—built for hard usage and will be on the job all the time. $\frac{1}{4}$ to 3 H.P.—automatic.

Single and Two-stage Many Sizes and Styles

We manufacture a complete line of single and two-stage outfits. You are sure to find one that will meet your particular needs in style, size and price. Write at once for full information and descriptive literature. Use the coupon below, or a postcard will do.



Style "S" Single Stage Outfit. Belted only. Five sizes— $\frac{1}{4}$ to 3 H.P. motor required.

CURTIS PNEUMATIC MACHINERY CO.
1527 Kienlen Ave. • • • St. Louis, Mo.

Branch Office:

530-H Hudson Terminal • New York City



USE THIS

AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES

COUPON

CURTIS PNEUMATIC
MACHINERY CO.

ESTABLISHED 1854

1527 Kienlen Ave.,
St. Louis, Mo.

Gentlemen: Please send me full details on Curtis Air Compressors—your proposition and prices.

Name.....

Address.....

Jobber's Name.....

Address.....

Double Diamond Gears

As people are known by the company they keep, so automotive products are known by the jobbers who sell them. Good jobbers handle good goods. When a product is handled by a large number of good jobbers you can be sure of the quality and general dependability of that product.

The long list of good jobbers handling Double Diamond Gears leaves no doubt concerning Double Diamond quality. If the quality wasn't there these jobbers would have found it out long before this.

If you will write to us we will give you the name of the jobber in your locality who handles Double Diamond Gears. Ask him what his experience has been with them.

AUTOMOTIVE GEAR WORKS

Incorporated

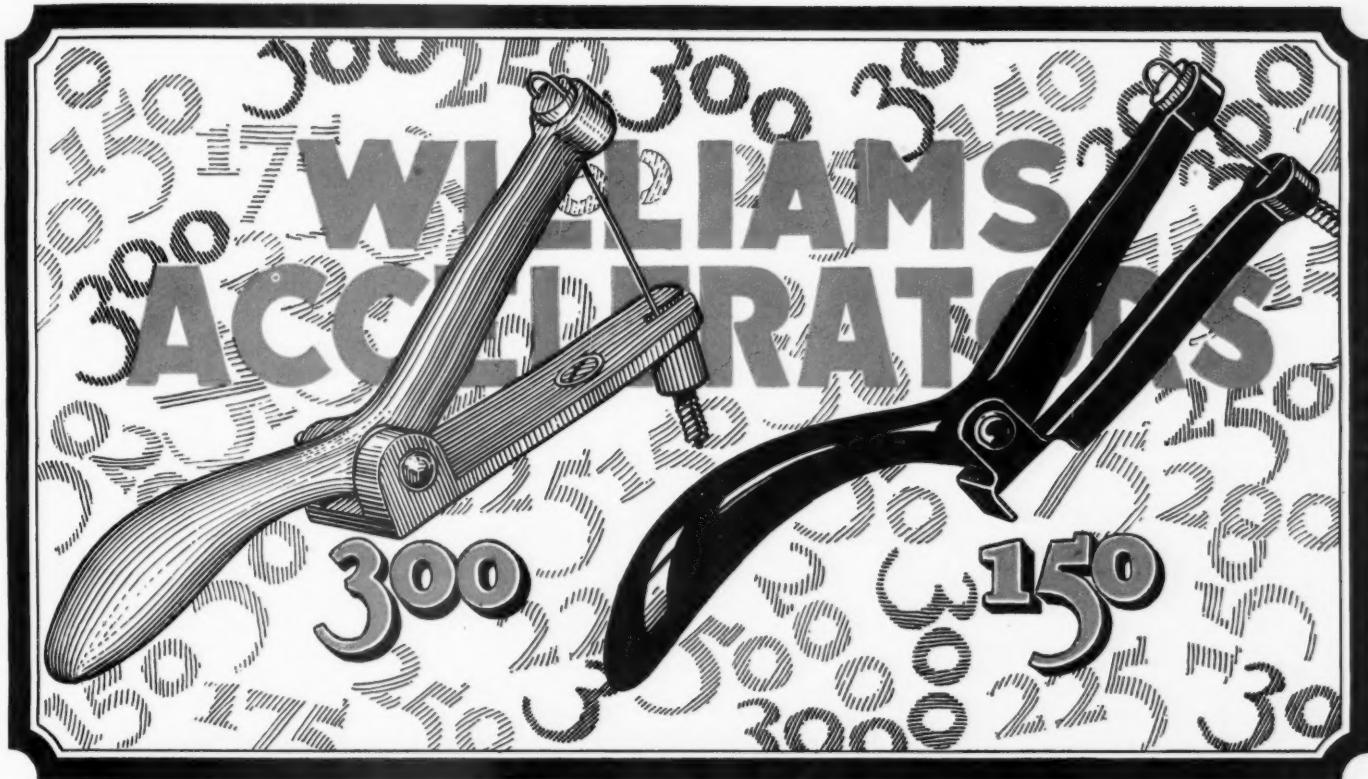
Factory and General Offices
8th & South O Sts.,
Richmond, Ind.

8 SALES BRANCHES

Address Automotive Gear Co. as follows:

Atlanta 174 Spring St.
Boston 1024 Commonwealth Ave.
Chicago 1425 S. Michigan Ave.
Cleveland 6305 Euclid Ave.
Los Angeles 1213 S. Hope St.
Philadelphia 1404 W. Girard Ave.
Seattle 520 E. Pike St.
Richmond, Indiana Factory





The outstanding values

The fact that Williams Accelerators are made and sold in two models offers you one of the most unusual profit opportunities in the entire accessory field.

For the Ford owner who wants the best, the Williams "Regular" which retails at \$3.00 gives him the best accelerator that money can buy—and allows you a substantial profit.

For the Ford owner who has wanted a *good* accelerator, but who has hesitated on account of price, the Williams "Junior" exactly fits

his needs and his pocketbook—and gives you a good profit besides.

Concentrate on the Williams line and you avoid slow moving stock. You avoid doubtful quality. Also the grief and trouble that makeshift imitations always cause.

Be sure and look us up when you come to the Show in November at Chicago. Both accelerators will be exhibited there.

Williams Accelerators are products that are made right and sold at the right price.

WILLIAMS BROS. AIRCRAFT CORP.

25th and Potrero Avenue
SAN FRANCISCO, CALIFORNIA

WILLIAMS
ACCELERATORS
for Fords

Service Right

H. S. GROVES, Prop.
TEL. CONN.

GROVES' TIRE S
77 W. MAIN ST
ORANGE, MASS

May 25, 1923.

TIRES
TUBES
ACCESSORIES
VULCANIZING
RADIO SUPPLIES
RADIO WIRING
BABY CARRIAGES RETIRED
EDISON MAZDA AUTO LAMPS
RUBBER FOOTWEAR REPAIRED
GAS-OIL-GREASES

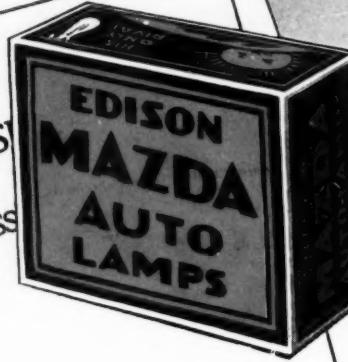
Edison Lamp Works of
General Electric Company,
Harrison, New Jersey.

Gentlemen:

I have found that a supply of the six-bulb
kits manufactured by you is a real big help in increas-
ing bulb sales. In about two out of three cases where
I have had a call for a bulb, I have been able to sell
a whole kit, by reminding customer that the law re-
quires a car be properly lighted. If a bulb is burned
out on the road and no spares are carried, driver is
violating law even in proceeding to nearest garage to
get a new one. It is very easy to convince a customer
that the cheapest and safest way is to always carry spare
bulbs of each type for his car.

By this method I have increased my bulb sales
nearly 400% in a few months.

Yours very truly,
Groves
H. S. GROVES
TIRE SHOP

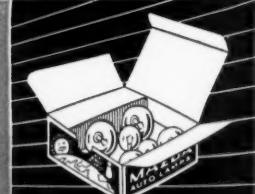


*The
Reason*

*The
Result*



**EDISON
MAZDA LAMPS**



A GENERAL ELECTRIC PRODUCT